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1961



OF CANADA.

# Review.

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TORONTO

## GENERAL METEOROLOGICAL REGISTER

FOR THE YEAR 1892.

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REMARKS ON THE METEOROLOGICAL RESULTS AT  
TORONTO FOR THE YEAR 1892.

## Review.

## TEMPERATURE.

The mean temperature of 1892 was  $44^{\circ} 01'$ , being  $0^{\circ} 45'$  warmer than the average of the previous 52 years, and  $1^{\circ} 26'$  colder than 1861. The mean temperature of the several months were in seven instances above and in five below the averages for their respective months, the average excess to the average defect being in the ratio of  $1^{\circ} 40'$  to  $1^{\circ} 56'$ . On each of 107 days the mean temperature was above the normal of that particular day and below on 169 days. The mean temperature of each month, with the difference from the normal was, January,  $59^{\circ} 55'$   $-1^{\circ} 06'$ ; February,  $25^{\circ} 25'$   $-2^{\circ} 04'$ ; March,  $27^{\circ} 58'$   $-1^{\circ} 12'$ ; April,  $40^{\circ} 08'$   $0^{\circ} 00'$ ; May,  $51^{\circ} 35'$   $0^{\circ} 74'$ ; June,  $63^{\circ} 04'$   $+2^{\circ} 07'$ ; July,  $68^{\circ} 41'$   $+0^{\circ} 51'$ ; August,  $67^{\circ} 36'$   $-1^{\circ} 04'$ ; September,  $60^{\circ} 16'$   $-1^{\circ} 57'$ ; October,  $47^{\circ} 46'$   $-13^{\circ} 38'$ ; November,  $35^{\circ} 35'$   $-0^{\circ} 76'$ ; December,  $26^{\circ} 01'$   $-0^{\circ} 21'$ . Dividing the year into the ordinary seasons, we have for winter,  $24^{\circ} 40'$  spring,  $32^{\circ} 40'$ ; summer,  $65^{\circ} 16'$ ; autumn,  $36^{\circ} 24'$ . The thermic anomalies differ from the normal temperatures proper to the latitude. Winter,  $-11^{\circ} 41'$ ; spring,  $5^{\circ} 18'$ ; summer,  $14^{\circ} 04'$ ; autumn,  $8^{\circ} 00'$ . The only month during the year in which the observed temperature exceeded the normal value of the latitude was June, which was  $0^{\circ} 44'$  warmer. The mean daily range for the year was  $15^{\circ} 38'$ , the greatest monthly average occurring in July, ( $21^{\circ} 21'$ ) and the least in November, ( $10^{\circ} 44'$ ). The greatest range,  $38^{\circ} 06'$ , occurred on the 25th January, and the least, ( $3^{\circ} 01'$ ) on the 21st of April. The warmest month relatively was June, estimated by its excess ( $2^{\circ} 07'$ ) above the normal temperature. The coldest absolutely was January ( $20^{\circ} 55'$ ) it was also the coldest relatively, its mean being  $18^{\circ} 66'$  below its proper normal. The climatic difference was  $47^{\circ} 36'$ . The warmest day was the 28th July, mean temperature  $79^{\circ} 07'$ , and the coldest the 10th January, with a mean temperature of  $1^{\circ} 08'$ , but the warmest day relatively was the 1st January, it being  $16^{\circ} 28'$  above its proper normal, and the coldest also occurred in January, on the 26th, which was  $20^{\circ} 42'$  below the normal. The average temperature of the warmest and coldest days from former years was  $77^{\circ} 86'$  and  $2^{\circ} 14'$  below zero. The highest temperature of the year  $63^{\circ} 45'$  occurred on the 28th July, the lowest,  $10^{\circ} 22'$  below zero, on the 26th January. The annual range from the extremes was  $103^{\circ} 17'$ , being  $0^{\circ} 8'$  more than 1891, and  $0^{\circ} 9'$  above the average annual range. There were twelve instances on which the temperature at the hour of observation was  $20^{\circ}$  above the normal, and seventeen when a defect of an equal amount occurred. The most striking deviation from the normal curves of temperature have been as follows:

## IN EXCESS.

January	1st mean deviation	$16^{\circ} 28'$	April	5th mean deviation	$18^{\circ} 72'$
April	2nd "	$16^{\circ} 35'$	June	13th "	$14^{\circ} 35'$
"	3rd "	$16^{\circ} 37'$			

## IN DEFECT.

January	16th mean deviation	$20^{\circ} 57'$	March	13th mean deviation	$14^{\circ} 79'$
"	20th "	$14^{\circ} 03'$	April	24th "	$1^{\circ} 56'$
"	26th "	$20^{\circ} 42'$	Nov'cr	23rd "	$15^{\circ} 13'$
February	12th "	$15^{\circ} 35'$	December	26th "	$18^{\circ} 15'$
"	13th "	$17^{\circ} 13'$			

The depression while continuing to develop drew quickly southeastward across the Lakes to the Middle Atlantic Coast where it joined with another depression; the combined system on the 6th moved northeastward as a severe storm to the Maritime Provinces, there causing a heavy northeast gale with snow and sleet, while in the St. Lawrence Valley and Lake Region the weather was fair and cold with northeast to northwest winds.

On the 7th the storm passed away across the Gulf of St. Lawrence and a depression moved into our North-west Territories from the northward, the weather in the Territories being quite mild. The morning chart of the 8th showed a well developed storm centre in Manitoba, by evening it was over Lake Superior, and during the night moved with increasing energy to the Lower Lakes, there causing a considerable snow fall, while a high area coming from the north of Manitoba caused very cold northwest gales behind the storm. As during the night of the 9th it moved eastward a heavy easterly gale set in over the Maritime Provinces and the weather turned intensely cold in Ontario; on the 10th the centre moved north to Eastern Quebec and thence eastward, the weather

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## BAROMETRIC PRESSURE.

The mean height of the Barometer was 29.6325 inches, being .00134 inches in excess of the average. The month which showed the greatest deviation from the normal was February, .0086 in excess, May showing the least .0031 in defect. Average deviation without reference to sign, was small, being only .0039. The highest reading was 30.350 inches at 8 a.m. of February 27th, and the lowest 28.846 at 8 a.m. of February 12th, giving a range of pressure of 1.504 inches.

The number of days of large abnormal variation in which the average pressure differed by two tenths and upwards from the normal, was 125, the law of their distribution is well marked by their great frequency in the winter than in the summer months, the greatest number (18) occurring in February, and least (1) in August.

## HUMIDITY.

The mean humidity of the year was 77 being equal to the average, the greatest monthly humidity was 86 in February, and the least 63 in April.

There were 24 cases of complete saturation at the hour of observation: 1 in January, 7 in February, 2 in March, 2 in April, 6 in May, 1 in July, 3 in September, 1 in November and 1 in December. The least humidity of the year at the hour of observation was 21 on the 23rd of April at 2 p.m.

## CLOUDS.

The extent of the sky clouded was on the average of the year six-tenths of the whole. July was the clearest month and November the most cloudy, during the year there were 57 days completely clouded, being 14 less than the average (1891-70), the greatest number (12) occurring in November, none being registered in September.

## WIND.

The resultant direction of the wind was N 54 W showing 3° more northing than 1891, and 7° more southing than the 15 years to 1889. The mean velocity of the wind without reference to direction was 8.17 miles. The most windy month was December, with an average of 10.20 miles per hour, and the least windy was July, with an average of 5.50 miles. The windiest day was January 21st, average velocity 33.37 miles per hour, and the day of least velocity October 13th, average velocity 0.00 per hour. The highest velocity in one hour was 44 miles 10 to 11 a.m. of the 1st of November.

## RAIN AND SNOW.

The total depth of rain that fell during the year was 25.285 inches, being 2.110 inches less than the average and 1.450 less than the rainfall of 1891. The depth of snow 42.2 inches was 27.2 inches less than the average, and 5.6 inches less than the snowfall of 1891. June is the most rainy month as to quantity (5.810), and May and June with reference to the number of rainy days. January is the least rainy month less than two-tenths of an inch having fallen, about one-sixth of the usual quantity for that month.

The most rainy day was the 16th of June when 2.420 inches fell. There was only two other days during the year that over one inch fell, the 25th of August when 1.06 inches fell, and the 13th of September when 1.820 inches fell.

The heaviest fall of Snow in one day was 6.2 inches on the 2nd of February. Rain fell on 134 days, being 21 more than the average number and 9 more than in 1891. Snow fell on 83 days being 17 more than the average and 13 more than 1891. There were 105 days in which neither rain nor snow fell, in 1891 the number was 103. The rain occupied 509 hours and the snow 332 hours, in its fall giving a total of 841 hours or 35 days and 1 hour, when rain or snow was actually falling.

## THUNDER STORMS.

Of the 40 thunder storms occurring during the year, the first was on the 7th of February, and the latest on October 3rd. 1 was recorded in February, 2 in May, 10 in June, 12 in July, 8 in August, 6 in September and 4 in October. The most severe storms were on the 8th and 10th of June, 12th, 15th, 23rd and 25th of July, 9th and 10th of August.

Lightning alone was observed on 3 occasions.

## AURORA.

Auroral displays were more numerous than in the previous year. Of the 33 observed 5 were of the first class, 3 of the second class, 9 of the third class and 16 of the fourth class. There were 105 nights favourable for observation, the most brilliant displays occurring on the 20th of January, 13th of February, 25th of April, 18th of May and 16th of July.

## SUNSHINE.

The total duration of bright sunshine during the year was 2054.4 hours, number of hours the sun was above the horizon 4474.4 ratio of registered to possible, 0.46 hours.

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## GENERAL METEOROLOGICAL

MAGNETIC OBSERVATORY.

Latitude 48° 39' 4 N. Longitude 5h. 15m. 34.65 W. Elevation

	JAN.	FEB.	MAR.	APRIL	MAY.	JUNE.	JULY.
Average temperature . . . . .	29.5	25.25	27.58	40.38	51.35	65.04	68.11
Difference from average (52 years) . . . . .	-1.36	-2.61	-1.12	0.09	-0.71	2.96	0.51
Thermic anomaly (Lat. 48° 40')	-12.25	-9.45	-12.52	-9.22	-6.75	0.44	0.20
Highest temperature . . . . .	46.1	34.1	45.6	71.6	75.0	85.9	93.5
Lowest temperature . . . . .	-10.2	-6.2	-5.3	20.2	35.1	48.1	44.0
Monthly and annual ranges . . . . .	56.3	40.3	50.9	51.4	39.9	37.8	49.5
Average maximum temperature . . . . .	25.53	30.94	31.46	40.28	50.65	64.17	68.80
Average minimum temperature . . . . .	11.26	17.51	20.71	32.14	41.99	56.74	55.60
Average daily range . . . . .	16.29	13.45	12.15	17.96	11.51	17.43	21.21
Greatest daily range . . . . .	58.6	21.3	24.1	33.5	25.6	31.8	27.2
Average height of bar. at 32° Fah. . . . .	29.6902	29.7243	29.6099	29.6599	29.5172	29.5590	29.6619
Difference from average (5) years . . . . .	-0.0022	0.0029	0.0051	0.0049	-0.0345	-0.0188	0.0519
Highest barometer . . . . .	30.174	30.356	30.112	30.201	30.014	29.847	30.192
Lowest barometer . . . . .	29.090	28.846	28.957	29.169	29.198	29.082	29.252
Monthly and annual ranges . . . . .	1.174	1.510	1.155	1.031	0.816	0.765	0.940
Average humidity of the air . . . . .	83	86	74	63	71	78	73
Difference from average . . . . .	0	3	-1	-8	4	5	1
Average elasticity of aqueous vapour . . . . .	0.100	0.120	0.115	0.164	0.281	0.483	0.512
Average temp. of the dew point. . . . .	18.1	23.5	21.4	29.6	43.6	58.0	59.7
Average of cloudiness . . . . .	0.71	0.71	0.51	0.49	0.68	0.62	0.39
Difference from average (8 years) . . . . .	-0.05	0.05	-0.13	-0.10	0.12	0.10	-0.11
Resultant direction of wind . . . . .	N 8° W	N 7° E	N 1° W	N 62° W	N 18° E	S 63° E	S 43° W
Velocity of wind . . . . .	2.92	7.74	3.77	3.22	1.05	0.62	0.34
Average velocity (miles per hour). . . . .	8.40	9.20	9.60	9.81	7.92	6.10	5.59
Difference from average (16 years) . . . . .	...	...	...	...	...	...	...
Total amount of rain in inches . . . . .	0.195	0.620	0.550	1.225	3.480	5.810	2.540
Difference from average (52 years) . . . . .	-1.067	-0.295	-0.919	0.085	0.639	2.891	-0.525
Number of days of rain . . . . .	7	6	6	10	18	18	14
Total amount of snow in inches . . . . .	1.0	16.5	2.1	0.3	0.0	...	...
Difference from average (19 years) . . . . .	-3.03	-9.56	15.20	-2.05	-0.11	...	...
Number of days of snow . . . . .	18	14	14	5	0	...	...
Number of fair days . . . . .	11	11	15	18	13	12	17
Number of days completely clouded . . . . .	10	10	3	1	7	2	1
Number of aurora observed . . . . .	1	2	8	6	1	2	4
Possible to see aurora (No. of nights) . . . . .	11	9	19	16	13	17	20
Number of thunder-storms . . . . .	0	1	0	0	2	10	12
Number of fogs . . . . .	0	5	0	2	9	4	1
Number of hours of bright sunshine . . . . .	89.5	109.8	184.0	224.8	162.9	217.5	313.5
Number of hours of possible sunshine . . . . .	285.7	322.5	369.0	466.5	464.1	465.7	450.0

## TORONTO, ONTARIO.

Elevation above the sea, 350 feet.

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## Review.

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## TEMPERATURE.

	1892.	Average of 52 years.	EXTREMES.	
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Average temperature of the year .....	44.61	44.16	47.09 in 1878	40.77 in 1873
Warmest month .....	July	July	July, 1894	Aug., 1890
Average temperature of the warmest month .....	68.11	67.60	75.89	64.46
Coldest month .....	January	January	Feb., 1875	Feb., 1848
Average temperature of the coldest month .....	29.55	22.51	19.16	26.00
Difference between the temperature of the warmest and coldest month .....	47.56	45.09	...	...
Average of deviations of monthly means from their respective averages of 51 years, signs of deviations being disregarded .....	1.25	2.56	3.64	...
Month of greatest deviation without regard to sign .....	June	January	Feb., 1875	...
Corresponding magnitude of deviation .....	2.97	4.63	12.48	...
Warmest day .....	28 July	...	July 14, '68	July 31, '44
Average temperature of the warmest day .....	79.67	77.86	84.50	72.75
Coldest day .....	19 Jan.	...	Feb. 6, 1855	Dec., 2, '42
Average temperature of the coldest day .....	1.68	-2.14	14.38	9.57
Date of the highest temperature .....	28 July	...	Aug. 24, '54	Aug. 19, '40
Highest temperature .....	103.5	99.77	99.2	82.1
Date of the lowest temperature .....	29 Jan.	...	Jan. 16, '59	Jan. 2, 1842
Lowest temperature .....	-10.2	-12.0	-26.5	1.9
Range of the year .....	103.7	102.86	118.2	87.0

## BAROMETER.

	1892.	Average of 51 years.	EXTREMES.	
Average pressure of the year .....	29.6325	29.6191	29.6779	29.5602
Month of the highest average pressure .....	February	Sept.	Jan., 1849	in 1864
Highest monthly average pressure .....	29.7243	29.6674	29.8046	29.6525
Month of the lowest average pressure .....	May	June	March, 1859	Nov., 1859
Lowest monthly average pressure .....	29.5472	29.5697	29.4145	29.5886
Date of the highest pressure in the year .....	27 Feb.	...	Jan. 8, 1896	March 7, '78
Highest pressure .....	30.356	30.357	30.940	30.139
Date of the lowest pressure in the year .....	11 Feb.	...	Jan. 2, 1870	March 7, '45
Lowest pressure .....	28.846	28.690	28.166	28.939
Range of the year .....	1.510	1.667	2.783 in 1896	1.303 in 1845

## RELATIVE HUMIDITY.

	1892.	Average of 51 years.	EXTREMES.	
Average humidity of the year .....	77	77	82 in 1851	73 in 1838
Month of greatest humidity .....	February	January	Jan., 1857	Dec., 1838
Greatest average monthly humidity .....	86	83	80	81
Month of least humidity .....	April	May	Feb., 1843	April, 1849
Least average monthly humidity .....	63	70	68	76



## EXTENT OF SKY CLOUDED.

	1892.	Average of 39 Years.	EXTREMES.
Average cloudiness of the year.....	0.61	0.62	0.66 in '69 0.57 in 1856.
Most cloudy month.....	Nov.	Dec.	.....
Greatest monthly average of cloudiness.....	0.89	0.77	0.89 0.73
Least cloudy month.....	July.	July.	.....
Least monthly average of cloudiness.....	0.39	0.50	0.29 0.50

## WIND.

	1892.	Average of 16 Years.	EXTREMES.
Resultant direction.....	N. 54° W. N. 61° W.	.....	.....
Resultant velocity in miles.....	1.81	2.51	.....
Average velocity without regard to direction.....	8.17	9.64	10.54 in '80, 8.32 in '78.
Month of greatest average velocity.....	Dec.	March.	April, '80, Dec., 1875.
Greatest monthly average velocity.....	10.29	11.49	13.88 10.42
Month of least average velocity.....	July.	July.	July, '78, July, 1881.
Least monthly average velocity.....	5.50	7.56	5.93 8.43
Day of greatest average velocity.....	Jan. 21.	.....	Nov. 17, '80, Feb. 10, '85.
Greatest daily average velocity.....	33.37	28.12	41.67 22.79
Day of least average velocity.....	Oct. 13	.....	.....
Least daily average velocity.....	0.60	.....	.....
Hour of greatest absolute velocity.....	Nov. 1. 10 to 11 a.m.	.....	Nov. 7, '80 3 to 4 a.m. Jan. 17, '85, 10 to 11 a.m.
Greatest velocity.....	44.0	43.77	55.5 39.0

NOTE.—During the year 1892, the wind has been obtained from the records of the anemograph at the Island and the entries at observation hours, and no comparison has been made with the result of former years.

## RAIN.

	1892.	Average of 52 Years.	EXTREMES.
Total depth of rain in inches.....	25.285	27.404	43.555 in '43, 17.574 in '74.
Number of days on which rain fell.....	134	113	145 in 1890 89 in 1841.
Month on which the greatest depth of rain fell.....	June.	Sept.	Sept., 1843 June, 1857.
Greatest depth of rain in one month.....	5.810	3.230	9.760 2.655
Month in which the days of rain were most frequent.....	May & June.	Oct.	Jan., '60, May, 1841
Greatest number of rainy days in one month.....	18	13	Oct., '90, 11
Day on which the greatest amount of rain fell.....	June 19.	.....	Sept., 14, '43 Sept., 14, '48
Greatest amount of rain in one day.....	2.420*	1.897	3.455 1.009

\*Nearly the whole amount fell in 25 minutes.

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## SNOW.

	1892.	Average of 49 years.	EXTREMES.
Total depth of snow in inches .....	42.2	64.4	122.9 in '70. 34.6 in '88.
Number of days on which snow fell .....	83	66	87 in 1870. 37 in '88.
Month in which the greatest depth of snow fell .....	Feb.	January.	March, '70. Dec., 1881.
Greatest depth of snow in one month .....	16.5	17.1	62.4 10.7
Month in which the days of snow were most frequent .....	Jan. & Nov.	January.	Dec., 1872. Feb., 1848.
Greatest number of days of snow in one month .....	18	14	24 8
Day in which the greatest amount of snow fell .....	2nd Feb.	—	Feb. 5, '63. 4.6 Jan '88
Greatest fall of snow in one day .....	6.2	9.0	16.0 3.0

## SUNSHINE.

	1892.	Average 1882 to 1891.
Total duration of bright sunshine in hours .....	2654.4	2621.3
Ratio to possible amount .....	0.46	0.45
Month of greatest relative amount .....	July.	July.
Ratio to possible amount .....	0.65	0.61
Month of least relative amount .....	November.	December.
Ratio to possible amount .....	0.16	0.10
Number of days completely clouded .....	57	51
Day of greatest relative amount .....	Sept. 28—Oct. 1	—
Ratio to possible amount .....	0.02	0.91

## DIFFERENCES OF CERTAIN METEOROLOGICAL ELEMENTS FOR 1892 FROM THE NORMAL VALUES FOR EACH QUARTER AND YEAR.

	Bar.	Tem.	Rain	Days Rain.	Snow.	Days Snow.	Cloud- ed Sky.
	in.	s.	in.		in.	p. c.	p. c.
Winter .....	65.4	- 0.16	- 2.23	- 0.98	- 14.78	+ 7.91	- 0.04
Spring .....	64.8	- 0.77	+ 2.465	+ 12.09	- 2.19	- 1.00	+ 0.4
Summer .....	65.9	- 1.09	+ 0.456	+ 6.41	—	—	+ 0.66
Autumn .....	66.7	- 0.14	- 2.819	+ 3.54	- 10.19	+ 11.54	- 0.63
Year .....	65.4	- 0.45	- 2.119	- 21.66	- 27.16	+ 17.25	- 0.61

## PERIODICAL OR OCCASIONAL EVENTS, 1892.

January.....	1. Warm and unseasonable; sailing and row boats on bay; more like May weather. 3d. Bay frozen over. 19th. Coldest day of year; average, 1908.
February.....	4. Crows numerous and noisy. 7th. First thunderstorm of year. 13. Brilliant aurora before daybreak and after sunset. 15th. Robins seen. 19. Inner se flocks of ducks on lake. 22d. Crows and Mosquitoes.
March.....	3. Robins again about. 26. Robins and Song sparrow; numerous; first Butterfly seen; Blue bird. 28. Gray birds numerous; Schooner went out eastern gulf; Hawk seen. 29. Geese flying N.W.; Schooner White Oak arrived. 31. Gulls passing N.
April.....	1. Bronze grackle seen. 3d. Butterflies numerous; Juncos seen; High-holder seen. 5th. Frogs piping; Lightning. 6. House sparrows building. 10. Last snow of season. 12th. Phoebe birds seen; Arbutus in bloom. 14. Meadow lark. 18th. Large hawk seen; Golden crested kinglet. 18. House wren, hairy woodpecker, Kingfisher. 23. Swallows. 23th. Thin ice. 30. Last frost of season.
May.....	7. Sandpiper seen. 10th. Water in bay 26 in. lower than last year. 14th. Humming birds, Oriole. 16. First trip of Gholis to Niagara. 17th. Scarlet tanager seen. 19. May beetles and Yellow birds seen; Plum trees in blossom. 28. Peach in blossom. 30th. Apples in blossom. 31. Flowering almond; Lilac and Japonica in flower.
June.....	13. Fireflies seen.
August.....	23. Robins very numerous.
September.....	29. First frost noted.
October.....	2. Last thunder of season. 7. Large flocks of small birds.
November.....	2. Woodpeckers numerous. 5th. Earliest ice. 4. First snow. 7th. First measurable snow.
December.....	20. Thin ice on bay. 23d. Bay frozen over.



## OF CANADA.

## Review.

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The depression while continuing to develop drew quickly southeastward across the Lakes to the Middle Atlantic Coast where it joined with another depression; the combined system on the 6th moved northeastward as a severe storm to the Maritime Provinces, there causing a heavy northeast gale with snow and sleet, while in the St. Lawrence Valley and Lake Region the weather was fair and cold with northeast to northwest winds.

On the 7th the storm passed away across the Gulf of St. Lawrence and a depression moved into our North-west Territories from the northward, the weather in the Territories being quite mild. The morning chart of the 8th showed a well developed storm centre in Manitoba, by evening it was over Lake Superior, and during the night moved with increasing energy to the Lower Lakes, there causing a considerable snow fall, while a high area coming from the north of Manitoba caused very cold northwest gales behind the storm. As during the night of the 9th it moved eastward a heavy easterly gale set in over the Maritime Provinces and the weather turned intensely cold in Ontario; on the 10th the centre moved north to Eastern Quebec and thence eastward, the weather,



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METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

JANUARY, 1893.

## INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

## ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraphic reporting stations, was above the normal of nineteen years at all stations except in the North-west Territories.

The area of mean atmospheric pressure of greatest departure below normal ( $-0.15$  in.) lay off the Atlantic Coast to the southward of Nova Scotia and to the northward of Bermuda while the area of mean highest pressure—about  $0.10$  in. above normal—lay over the middle and northern plateaux of the United States. Stations in the Middle Atlantic States and in Northern Ontario showed the greatest difference below normal temperature, the departure being  $10^{\circ}$ . Areas of depression were somewhat erratic in their movements, but an approximate mean track is from Alberta east-southeastward to Lake Michigan, thence across Southern Ontario to the Gulf of St. Lawrence. The average rate of movement was about 38 miles per hour or about normal. During the first part of the month several very important cyclonic movements occurred, three of which caused heavy gales in the Maritime Provinces. The most pronounced anti-cyclonic movement, began in the North-west Territories on the 24th and continued until the end of the month accompanied by excessively cold weather, in strong contrast to the exceptionally mild weather of the early part of the month.

The first storm to be noted was on the morning of the 1st centred near Louisville, Ky., whence it moved northeastward to the Lower Lakes and thence down the St. Lawrence, causing a heavy fall of snow and rain in Ontario and a heavy easterly to southerly gale with rain in Quebec and the Maritime Provinces. At the same time there was an anti-cyclonic development with a very decided fall in temperature north and west of Lake Superior, this spread gradually eastward in the rear of the storm, and during the evening and night of the 2nd the temperature fell very decidedly in Ontario and Quebec. The charts of the 3rd showed the disturbance dispersing over the Gulf of St. Lawrence, with mild weather in the Maritime Provinces, marked cyclonic conditions over the North-west Territories with very mild weather in Saskatchewan and Alberta, while over the Lake Region there was relatively high pressure with temperature considerably below average.

During the greater part of the 4th there was no very decided change in pressure conditions from the Lakes eastward, the weather continued cold in Ontario and Quebec and turned cold in the Maritime Provinces. By evening there was an area of depression rapidly developing over the western part of the Lake Region and a rapid increase in pressure with falling temperature north and west of Manitoba; a moderately heavy snow fall occurred over the greater part of Ontario and also in Nova Scotia. The depression while continuing to develop drew quickly southeastward across the Lakes to the Middle Atlantic Coast where it joined with another depression; the combined system on the 6th moved northeastward as a severe storm to the Maritime Provinces, there causing a heavy northeast gale with snow and sleet, while in the St. Lawrence Valley and Lake Region the weather was fair and cold with northeast to northwest winds.

On the 7th the storm passed away across the Gulf of St. Lawrence and a depression moved into our North-west Territories from the northward, the weather in the Territories being quite mild. The morning chart of the 8th showed a well developed storm centre in Manitoba, by evening it was over Lake Superior, and during the night moved with increasing energy to the Lower Lakes, there causing a considerable snow fall, while a high area coming from the north of Manitoba caused very cold northwest gales behind the storm. As during the night of the 9th it moved eastward a heavy easterly gale set in over the Maritime Provinces and the weather turned intensely cold in Ontario; on the 10th the centre moved north to Eastern Quebec and thence eastward, the weather,

continued very cold on both days in Ontario and on the 11th changed from comparatively mild to decidedly cold in Quebec and the Maritime Provinces.

On the 11th an area of about average pressure extended from Northern Ontario to the South Atlantic States accompanied by temperature far below normal; this moved east and became less pronounced as the day passed, while a trough of low pressure moved from the Upper Mississippi and Missouri Valleys to the Lake Region, and behind it over the western portion of the Continent there was an increase in anti-cyclonic conditions. During the 12th the centre of depression passed to the southward of the Lower Lake Region where it caused some light snow and thence off the Middle Atlantic Coast as a minor disturbance.

From the 13th until the 24th pressure changes over the Continent were generally not very pronounced; the temperature from Ontario eastward was for the most part a little below average while in the North-west Territories the weather was quite mild. In Manitoba until the 18th it held decidedly low and then gradually became more moderate. Among the more important of the minor depressions which were observed during this period was one which moved northeast from the Middle Atlantic Coast to the Maritime Provinces, there causing heavy rain during the night of the 15th. Another depression on the 16th moved from Northern Alberta to Manitoba, causing a blizzard in many parts of the Territories and in Manitoba, but not accompanied by very low temperature. A slight depression north of Manitoba and Saskatchewan, between the 18th and 22nd, gave a gradient for southwesterly winds in Manitoba and brought a spell of mild weather.

On the 23rd a small depression moved southeastward across Alberta where it caused light snow and during the night was followed by a high area bringing a very decided fall in temperature. After passing across the Northwest States the depression moved from Iowa to Southern Michigan, then across Southern Ontario and eastward, passing across Nova Scotia during the early morning of the 26th; it caused several inches of snow in Ontario during the night of the 24th and in Quebec next day and a fall of rain and sleet in the Maritime Provinces on the night of the 25th. Meanwhile anti-cyclonic conditions became more pronounced and intensely cold weather extended east as far as Lake Superior. On the 26th a small depression formed over the Upper Lakes whence it passed quickly east with the high pressure spreading rapidly in behind it, bringing northerly winds and much colder weather as far east as the Maritime Provinces.

There was practically no break in the anti-cyclonic conditions over the North-west Territories up to the end of the month, and the weather continued unusually cold, temperatures of from  $40^{\circ}$  to  $65^{\circ}$  below zero being recorded. A depression moving northeast from the Mississippi Valley caused a fall of snow early on the 28th in the Lake Region which was succeeded by a short lived thaw lasting during the 29th, after which as the depression passed away down the St. Lawrence, the high pressure with colder weather again covered the Lakes. This depression caused snow and rain in the St. Lawrence Valley on the 29th, and in the Maritime Provinces that night, which as in Ontario was followed by a change to colder weather.

Another depression which passed across the Middle Plateau and Middle Slope of the United States on the 30th skirting the southern margin of the anti-cyclone in the North-west Territories, on the 31st moved from the Missouri Valley to Lake Superior causing a northerly gale and snow storm in Eastern Manitoba, while in the Lake Region the wind was strong easterly and weather cloudy with slowly rising temperature. The month closed with the anti-cyclone with undiminished energy and extremely low temperature still hovering over the Canadian North-west Territories.

#### TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was below the normal of nineteen years, except in Newfoundland and the North-west Territories. The defect was greatest in the eastern portions of Ontario and Western Quebec and at some stations exceeded  $10^{\circ}$ .

*The Highest and Lowest Temperatures in each Province during January were:*

British Columbia,  $63^{\circ}5$  on 7th at Fort Simpson;  $-45^{\circ}0$  on 31st at Donald.

North-west Territories,  $50^{\circ}8$  on 5th at Calgary;  $-59^{\circ}0$  on 20th at Prince Albert.

Manitoba,  $31^{\circ}0$  on 8th at Elkhorn;  $-47^{\circ}0$  on 26th at Oak Bank;  $-47^{\circ}0$  on 29th at Brandon.

Ontario,  $53^{\circ}0$  on 2nd at Zurich;  $-54^{\circ}5$  on 14th at White River.

Quebec,  $45^{\circ}0$  on 2nd at Cape Chatte;  $-35^{\circ}0$  on 8th at Point des Monts.

New Brunswick,  $50^{\circ}8$  on 2nd at Fredericton;  $-25^{\circ}5$  on 23rd at Chatham.

Nova Scotia,  $50^{\circ}0$  on 2nd at Truro;  $-14^{\circ}4$  on 23rd at Truro.

Prince Edward Island,  $41^{\circ}0$  on 3rd at Georgetown;  $-24^{\circ}1$  on 23rd at Kilmahumaig.



PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

[illegible]



NOTES.—Continued.																
Year.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Novar.....	29-39-6	4	29-34-6	6	3	5	4	6	0	2	3	12	47	84	II	18 SE
Orilla.....	29-32-0	10	18-7 45-0	—	—	—	—	—	—	—	—	—	—	—	—	2-62
Little Forks.....	29-32-0	14	29-54-3	79	5	7	39	0	1	11	23	6	0	93	II	15 NW
Fort Francis.....	22-38-0	10	23-43-0	—	—	—	—	—	—	—	—	—	—	—	—	1-50
*Shannonville.....	29-29-0	11	—	—	—	—	—	—	—	—	—	—	—	—	—	2-67
Queens:																
St. Regis.....	29-34-04 28-94	1-76	4-1	7-6	18-17	29	18-4	11	12-8 31-4	2-3	81	6	5	183	79	27
St. Hyacinthe.....	29-29-0	12	18-8 42-0	—	—	—	—	—	—	—	—	—	—	—	—	30-1
Richmond.....	29-25-0	12	21-9 30-0	—	—	—	—	—	—	—	—	—	—	—	—	2-33
Broome.....	29-32-0 70-28-92	1-78	3-9	1-4	15-30-8	29	18-1	12	15-8 31-0	—	—	—	—	—	—	1-42
Quebec.....	29-32-0 70-28-92	1-78	3-9	1-4	15-30-8	29	18-1	12	15-8 31-0	—	—	—	—	—	—	1-59
Father Point.....	29-85-30 70-28-82	1-88	5-6	3-6	13-42-5	29	16-8	5	3-8 13-36-6	3	5	8	5	14	9	20
Point du Monts.....	29-85-30 70-28-82	1-88	5-6	3-6	13-42-5	29	16-8	5	3-8 13-36-6	3	5	8	5	14	9	20
Cape Charlotte.....	29-32-0 44-5	0	4-0	1-5	8-30-0	2	35-9	8	—	—	—	—	—	—	—	1-64
Cape Magdalen.....	29-32-0 44-5	0	4-0	1-5	8-30-0	2	35-9	8	—	—	—	—	—	—	—	3-30
New Brunswick:																
Fredericton.....	29-81-30 50-29-02	1-48	7-5	4-7	30-50-8	2	25-5	23	22-6 50-79	1-0	82	4	4	1	11	3
Chatham.....	29-82-30 52-28-91	1-61	5-5	4-5	19-47-0	2	25-5	23	21-7 36-5	—	—	—	—	—	—	3-81
Barbours.....	29-78-30 50-29-16	1-54	11-4	4-5	19-45-0	2	25-0	14	28 44-0	—	—	—	—	—	—	3-29
St. Andrews.....	29-83-30 50-29-04	1-56	13-6	5-8	18-48-8	2	11-2	12	20-5 38-2	—	—	—	—	—	—	3-20
Grand Manan.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
Point Lepreau.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
Pereborough.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
Dalhousie.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
Antigonish.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
Halifax.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
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St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
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St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
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St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
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St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
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St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
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St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
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St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—	—	2-46
St. John's.....	29-83-30 50-29-07	1-52	18-1	5-8	19-47-8	2	11-2	12	15-3 34-0	—	—	—	—	—		

QTEBEC	29-04	30-04	28-04	1-76	23	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0	0
Montreal	4-1	7-6	8-41-7	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
Quebec	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
St-Hyacinthe	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
Richmond	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
St-Charles	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
Quebec	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
St-Hyacinthe	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
Richmond	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
St-Charles	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
Quebec	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
St-Hyacinthe	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
Richmond	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
St-Charles	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
Quebec	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1	0 <td>0</td>	0	
St-Hyacinthe	5-4	9-5	7-42-0	29	16-4	11	12-8-32-4	2-3	81	6	5	18-3	79	27	39	20	63	220	106	0	744	14.8	30-1	10 W	2-39	-1-16	16	15	1			

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NOVA SCOTIA:																														
	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0	0	0
Halifax.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
Sydney.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
Yarmouth.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
Truro.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1-7	9	15-5-29-6	.....	7	11	12	2	1	4	2	6	18	11	6	62	.....	18-3	6 NE	4-78	-0-78-26	5	0 <td>0 <td>0</td> </td>	0 <td>0</td>	0
St. John's.....	29-8-30-55	29-12-11	20-4	1-3-19-45-8	2	1																								

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## PRECIPITATION.

The rainfall with the exception of the Province of Nova Scotia has been considerably less than the normal.

*The General Distribution is as follows :—*

In British Columbia the rainfall on the coast varied from 16 in. at Fort Simpson to 2·93 in. at Esquimalt. In the interior little has fallen.

In the North-West Territories it was inappreciable, or about the same as in 1892.

In Manitoba no rain is recorded except a few drops at one or two stations.

In Ontario, West and South-West District it was 0·32 in., or 1·24 in. below the average. In the North and North-West District it was 0·36 in., or 0·36 in. below the average. In the Central District it was 0·52 in.; or 0·63 in. below the average; and in the East and North-East District it was 0·51 in.; or 0·29 in. below the average.

In Quebec it was 0·18 in., or 0·35 in. below the average.

In New Brunswick it was 0·90 in., or 0·84 in. below the average.

In Nova Scotia it was 2·74 in., or 0·30 below the average.

In Prince Edward Island it was 1·09 in., or 0·13 in. below the average.

*Rainfall 5 in. and upwards during month :—*

British Columbia—Fort Simpson, 16·74 in.; Loch Erroch, 5·90 in.

Nova Scotia—Port Hastings, 8·60 in.

Newfoundland—St. John's, 5·74 in.

Bermuda, 6·74 in.

*Rainfall 1 inch and upwards in 24 hours :—*

1. Port Hastings, 3·60 in.; Parker's Ridge, 1·30 in.; Fort Simpson, 1·49 in.

2. Niagara Falls S., 1·06 in.; Fort Simpson, 2·84 in.; Truro, 1·20 in.

3. Loch Erroch, 1·10 in.; Abbotsford, 1·56 in.; Channel, 1·10 in.; Fort Simpson, 1·59 in.

4. Fort Simpson, 1·17 in.

5. Fort Simpson, 1·09 in.

8. Fort Simpson, 1·12 in.

9. Bermuda, 1·00 in.

10. Port Hastings, 3·00 in.

11. Channel, 1·35 in.; Georgetown, 1·07 in.; Fort Simpson, 2·07 in.

12. St. John, Nfld., 1·50 in.; Fort Simpson, 1·28 in.

13. Port Hastings, 1·05 in.

16. Whitehead, 1·23 in.

22. Agassiz, 1·06 in.

23. Agassiz, 1·06 in.

25. Bermuda, 1·57 in.

26. Bermuda, 1·40 in.

28. Presque Isle, 1·50 in.; London, 1·05 in.

29. Norwood, 1·10 in.; Elora, 1·15.

## SNOWFALL.

In ONTARIO the snowfall has, in general, considerably exceeded the average, the only provinces in which a deficit occurs are in Quebec and P. E. Island. The distribution is as follows :—

BRITISH COLUMBIA. On the coast the amount is considerably in excess of the normal; in the northern districts considerably less, while in the eastern upwards of seven feet has fallen.

In the N. W. TERRITORIES about 10·7 in. has fallen; over three times the amount in January, 1892.

In MANITOBA 7·8 in. has fallen, fifty per cent. more than in 1892.

In the same DISTRICTS OF ONTARIO, as shown in the rainfall, the amount is 25·3 in. or 8·6 in. above the average; 20·0 in. or 1·0 in. above the average; 26·6 in. or 7·2 in. above the average; 23·7 in. or 1·3 in. above the average.

In QUEBEC 18·2 in. or 8·9 in. below the average.

In N. BRUNSWICK 20·5 in. or 2·3 in. above the average.

In NOVA SCOTIA 20·8 in. or 2·0 in. above the average.

In P. E. ISLAND 20·0 in. or 0·5 in. below the average.

*Snowfall 15 inches and upwards during month.*

BRITISH COLUMBIA. Esquimalt, 16 in.; Nanaimo, 19 in.; Barkerville, 18 in.; Quamichan, 24 in.; Donald, 16 in.; French Creek, 18 in.; Glacier, 84 in.

MANITOBA and N. W. TERRITORIES.—Medicine Hat, 16 in.; Winnipeg, 15 in.; Gretna, 16 in.; Hartney, 19 in.; Posen, 24 in.; Oakbank, 19 in.; Clandeboye, 23 in.; Saskatoon, 16 in.; Cotham, 34 in.; Elkhorn, 31 in.

ONTARIO.—Georgetown, 30 in.; Conestogo, 17 in.; Point Clark, 39 in.; Barclay, 31 in.; Belleville, 20 in.; Mount Forest, 43 in.; Owen Sound, 52 in.; Buda, 24 in.; Bognor, 44 in.; Sault Ste. Marie, 32 in.; Norwood, 36 in.; Paris, 18 in.; Sombra, 28 in.; Pelee Island, 25 in.; Clontarf, 26 in.; Niagara Falls, S., 18 in.; Uplands, 24 in.; Whiteside, 31 in.; Sprucedale, 15 in.; Heron Bay, 19 in.; Sudbury, 25 in.; Port Hope, 42 in.; Denbigh, 32 in.; Thompson, 23 in.; Wiarton, 27 in.; Dealtown, 23 in.; Sarnia, 24 in.; Oliver's Ferry, 15 in.; Sunshine, 29 in.; Thedford, 29 in.; Presqu'Isle, 37 in.; Goderich, 31 in.; St. Thomas, 33 in.; Burk's Falls, 17 in.; Fergus, 32 in.; Midland, 24 in.; Coldstream, 33 in.; Orangeville, 38 in.; Princeton, 23 in.; Wilton Grove, 18 in.; Deer Park, 24 in.; Wyoming, 23 in.; Cayuga, 21 in.; Cowal, 28 in.; Ennismore, 15 in.; Fort Francis, 15 in.; Calvin, 30 in.; Orillia, 30 in.; Welland, 23 in.; Gravenhurst, 26 in.; Beatrice, 18 in.; Bancroft, 24 in.; North Bruce, 38 in.; DeCewsville, 20 in.; Sharon, 19 in.; Elora, 18 in.; Chatham, 25 in.; Stony Creek, 22 in.; St. George, 15 in.; Galt, 22 in.; Ridgetown, 33 in.; Cottam, 24 in.; Lakefield, 21 in.; Georgina, 28 in.; Lucknow, 51 in.; St. Mary's, 39 in.; Mattawa, 36 in.; Birnam, 42 in.; Peterborough, 26 in.; Novar, 17 in.; Shannouville, 25 in.; Egremont, 24 in.; Savanne, 15 in.; Nepigon, 16 in.; Saugeen, 53 in.; Port Stanley, 43 in.; Parry Sound, 36 in.; Kingston, 16 in.; Toronto, 25 in.; Port Dover, 25 in.; Rockliffe, 21 in.; Lindsay, 22 in.; Ottawa, 30 in.; Alexandria, 28 in.; Durham, 43 in.; London, 21 in.; Little Forks, 15 in.; Guelph, 20 in.; Coldwater, 22 in.

QUEBEC.—St. Hyacinthe, 16 in.; Point des Monts, 33 in.; Montreal, 22 in.; Quebec, 17 in.; Father Point, 15 in.

N. BRUNSWICK.—St. John, 25 in.; Fredericton, 24 in.; Chatham, 31 in.; St. Andrews, 15 in.; Point Escuminac, 43 in.; Parker's Ridge, 25 in.; Dalhousie, 33 in.; Point Lepreaux, 26 in.; Dorchester, 19 in.; Bathurst, 24 in.

NOVA SCOTIA.—Digby, 29 in.; Cow Bay, 22 in.; Halifax, 17 in.; Yarmouth, 32 in.; Truro, 23 in.; Pictou, 21 in.; Whitehead, 15 in.

P. E. ISLAND.—Georgetown, 19 in.; Kilmahumag, 23 in.; Charlottetown, 21 in.

NEWFOUNDLAND.—St. John, 37 in.; Channel, 25 in.

*Snowfall 4 inches and upwards in 24 hours:—*

1. Birnam, 7 in.; St. Mary's, 5 in.; Sprucedale, 7 in.; Georgina, 5 in.; Shannouville, 4 in.; Point Clark, 6 in.; Elora, 5 in.; Sault Ste. Marie, 4 in.; Bognor, 5 in.; Egremont, 7 in.; Orillia, 8 in.; Sombra, 5 in.; Clontarf, 4 in.; Calvin, 4 in.; Belleville, 5 in.; Mount Forest, 7 in.; Galt, 6 in.; Aurora, 4 in.; Port Hope, 4 in.; Wiarton, 4 in.; Dealtown, 4 in.; Oliver's Ferry, 5 in.; Sarnia, 6 in.; Thedford, 11 in.; Presque-Isle, 6 in.; Goderich, 6 in.; Burk's Falls, 6 in.; Midland, 5 in.; Georgetown (Ont.), 6 in.; Coldstream, 4 in.; Cowal, 5 in.; Glastonbury, 10 in.; Saugeen, 4 in.; Port Stanley, 5 in.; Parry Sound, 4 in.; Deseronto, 4 in.; Ottawa, 8 in.; Durham, 12 in.; Barkerville, 4 in.; Deer Park, 6 in.; Wyoming, 6 in.; Alexandria, 8 in.; London, 4 in.; Montreal, 7 in.; Toronto, 4 in.

2. Bancroft, 8 in.; Sudbury, 6 in.; Chatham, 5 in.; Dalhousie, 4 in.; Beatrice, 6 in.; Gravenhurst, 4 in.; Conestogo, 6 in.; Norwood, 9 in.; Whiteside, 8 in.; Uplands, 6 in.; Bognor, 6 in.; Mount Forest, 6 in.; Mattawa, 7 in.; St. Mary's, 6 in.; Owen Sound, 8 in.; Posen, 7 in.; Denbigh, 8 in.; Sunshine, 6 in.; Presqu'Isle, 8 in.; Fergus, 9 in.; Orangeville, 7 in.; Princeton, 5 in.; Glacier, 9 in.; Ennismore, 4 in.; Parry Sound, 4 in.; Rockliffe, 4 in.; Coldwater, 4 in.

3. Point Clark, 5 in.; Point Escuminac, 5 in.; St. Mary's, 4 in.; Oakbank, 4 in.; Clandeboye, 4 in.; Glacier, 10 in.; Saugeen, 4 in.

4. Galt, 4 in.; Glacier, 10 in.

5. Port Hastings, 4 in.; Pictou, 5 in.; Presque-Isle, 4 in.; Georgetown, 6 in.; Princeton, 4 in.; Cowal, 6 in.; Cayuga, 5 in.; Savanne, 5 in.; Cow Bay, 5 in.; Port Stanley, 4 in.; Durham, 4 in.; Toronto, 5 in.

6. Stony Creek, 4 in.; Cotham, 7 in.; Whitehead, 6 in.; Pictou, 6 in.; Digby, 12 in.; Channel, 6 in.; Elkhorn, 6 in.; Pilot Mound, 4 in.; Turtle Mountain, 5 in.; Orangeville, 14 in.; Deer Park,

6 in.; Charlottetown, 6 in.; Yarmouth, 7 in.; Durham, 4 in.

7. Kilmahumnaig, 6 in.; Georgetown, P.E.I., 6 in.; Dorchester, 5 in.; Pelee Island, 7 in.; North Bruce, 6 in.; Guelph, 5 in.

8. Buda, 5 in.; Savanne, 5 in.; Heron Bay, 6 in.; Sombra, 5 in.; Barclay, 4 in.; Peterboro', 6 in.; North Bruce, 5 in.; Wiarton, 8 in.; Goderich, 4 in.

9. Sudbury, 4 in.; Chatham, 8 in.; Stony Creek, 4 in.; Novar, 4 in.; Paris, 6 in.; Norwood, 11 in.; Sault Ste. Marie, 4 in.; Welland, 9 in.; Pelee Island, 5 in.; Clontarf, 7 in.; Calvin, 7 in.; Ridgetown, 7 in.; Birnam, 15 in.; Lucknow, 7 in.; Lakefield, 5 in.; Shannonville, 6 in.; Port Hope, 18 in.; Denbigh, 9 in.; Thompson, 9 in.; Dealtown, 5 in.; Presqu'Isle, 4 in.; St. Thomas, 9 in.; Orangeville, 8 in.; Wilton Grove, 12 in.; Georgetown (Ont.), 4 in.; Coldstream, 8 in.; Cowal, 5 in.; Saugeen, 11 in.; Port Stanley, 9 in.; Parry Sound, 8 in.; Kingston, 7 in.; Fredericton, 4 in.; Durham, 6 in.; London, 5 in.

10. Bancroft, 4 in.; Point Lepreaux, 8 in.; Point Clark (9-10) 15 in.; Parker's Ridge, 10 in.; Kilmahumnaig, 4 in.; Point des Monts, 6 in.; Cottam, 4 in.; Glenbow, 4 in.; Coldstream, 5 in.; Cowal, 4 in.; Wyoming, 4 in.; Saugeen, 5 in.; Chatham, N.B., 8 in.; St. Johns Nfld., 5 in.; Yarmouth, 5 in.; Ottawa, 7 in.; Truro, 6 in.

11. Dalhousie, 15 in.; Point Escuminac, 12 in.; Digby, 10 in.; Cape Magdalene, 4 in.; Cowal, 4 in.; Wyoming, 7 in.; Bathurst, 13 in.

12. Edmonton, 6 in.; Medicine Hat, 4 in.

13. Point Clark, 4 in.; Owen Sound, 9 in.

14. Cow Bay, 4 in.; Pictou, 4 in.; Wiarton, 4 in.; Halifax, 4 in.; St. Johns Nfld., 6 in.; Yarmouth, 7 in.; Fredericton, 13 in.

15. Point Clark, 5 in.; Point Escuminac, 10 in.; Parker's Ridge, 10 in.; Georgetown, P.E.I., 7 in.; Owen Sound, 8 in.; Thompson, 6 in.; Chatham, N.B., 6 in.

16. Heron Bay, 6 in.; Glastonbury, 4 in.

17. Elora, 4 in.; Whitehead, 2 in.; Orillia, 4 in.; Belleville, 4 in.

18. Norwood, 4 in.; Point des Monts, 11 in.; Lucknow, 12 in.; Owen Sound, 4 in.; Shannonville, 4 in.; Port Hope, 9 in.

19. St. Mary's, 4 in.

20. Barkerville, 4 in.; Griffin Lake, 4 in.; St. Johns Nfld., 7 in.

21. Barkerville, 5 in.; Donald, 5 in.; Glacier, 16 in.

22. Saskatoon, 12 in.; Cotham, 8 in.; Norwood, 4 in.; Point Escuminac, 4 in.; Posen, 4 in.; Claudeboye, 4 in.; Glacier, 14 in.

23. Stony Creek, 4 in.; Uplands, 4 in.; Pelee Island, 4 in.; Sombra, 4 in.; Mattawa, 6 in.; Dealtown, 4 in.; Princeton, 5 in.; Glacier, 10 in.; Banff, 6 in.; Charlottetown, 5 in.; Medicine Hat, 6 in.; Ottawa, 4 in.; Durham, 6 in.

24. Chatham, 4 in.; Paris, 4 in.; Point Lepreaux, 6 in.; Norwood, 6 in.; Whitehead, 5 in.; Channel, 12 in.; Cottam, 6 in.; Shamouville, 4 in.; St. Thomas, 5 in.; Ennismore, 4 in.; Deer Park, 5 in.; Quebec, 8 in.; Port Stanley, 6 in.; St. Andrews, 5 in.

25. Dalhousie, 9 in.; Sault Ste. Marie, 4 in.; Cow Bay, 8 in.; Point Escuminac, 8 in.; Kilmahumnaig, 4 in.; Georgetown, 5 in.; Port Hastings, 6 in.; Dorchester, 5 in.; Denbigh, 6 in.; Chatham, N.B., 5 in.; Charlottetown, 5 in.; St. Johns Nfld., 6 in.; Bathurst, 5 in.

26. Chicoutimi, 4 in.; Orillia, 4 in.; Claudeboye, 6 in.; Fergus, 5 in.

27. Bancroft, 5 in.; Sudbury, 6 in.; St. Hyacinthe, 4 in.; Calvin, 6 in.; Deer Park, 5 in.; Rockcliffe, 4 in.; Alexandria, 4 in.

28. Cotham, 6 in.; Sault Ste. Marie, 4 in.; Point Escuminac, 4 in.; Point des Monts, 7 in.; Mattawa, 4 in.; Posen, 6 in.; Quebec, 5 in.; Father Point, 4 in.; Charlottetown, 4 in.; Esquimalt, 9 in.; Bathurst, 4 in.

29. Dalhousie, 5 in.; Whiteside, 4 in.; Sombra, 5 in.; Mattawa, 4 in.; Quamichan, 18 in.; Esquimalt, 5 in.

30. Buda, 10 in.; Savanne, 5 in.; Cotham, 4 in.; Sault Ste. Marie, 4 in.; Fort Francis, 6 in.; Bombay, 12 in.; Oakbank, 7 in.; Gretna, 4 in.; Winnipeg, 6 in.; Quamichan, Port Arthur, 5 in.; Winnipeg, 7 in.; Little Falls, 5 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Wallace, III.
4. Posen, IV.
5. Quebec, IV.
6. Richmond, IV ; Posen, I ; Channel Island, IV ; Quebec, IV ; Father Point, IV ; Medicine Hat, III ; Alexandria, II.
7. Posen, III ; Chicoutimi, IV ; Gravenhurst, White River, III.
8. Wallace, IV ; Chicoutimi, IV ; Quebec, IV ; Little Forks, III.
9. Georgetown, P.E.I., Posen, II ; St. Albans, III ; Portage La Prairie, III ; Wallace, IV ; Hillview, Savanne, Gravenhurst ; Wallace, IV.
10. Clandeboye, *very bright*.
11. Saskatoon, IV ; Gravenhurst, Toronto, III.
12. St. Albans, III ; Channel Island, VI.
13. Portage La Prairie, III ; Alexandria, IV.
14. Elora, Clandeboye, *bright* ; Chicoutimi, IV ; Little Forks, II.
15. Elora, *bright* ; Chicoutimi, IV.
16. Elkhorn, II ; Mattawa, Chicoutimi, IV.
17. Wallace, IV ; Hillview, Father Point, IV.
18. Elkhorn, I ; Saskatoon, IV ; Portage La Prairie, IV ; Henrietta, III ; Hillview, Barrie, IV ; Chicoutimi, IV ; Savanne, Father Point, IV ; Medicine Hat, IV ; Minnedosa, IV ; Little Forks, IV.
19. Elkhorn, III ; Wallace, IV ; Cotham, IV ; Hillview, Father Point, IV ; Port Arthur, III ; White River, III ; Medicine Hat, IV ; Swift Current, II ; St. Andrew, IV ; Fredericton, IV.
20. Dorchester, N.B., Posen, I ; Burk's Falls, II ; Saskatoon, IV ; St. Albans, IV ; Portage La Prairie, II ; Wallace, IV ; Hillview, White River, III ; Battleford, IV ; Medicine Hat, IV ; Swift Current, II ; Minnedosa, IV.
21. Richmond, IV ; Fort Francis, Posen, II ; Midland, IV ; Saskatoon, IV ; Portage La Prairie, IV ; Channel Island, IV ; Wallace, IV ; Novar, Sharon, II ; Henrietta, III ; Oak Bank, II ; Clandeboye, *very bright* ; Coldwater, IV.
22. Channel Island, IV ; Wallace, IV ; Port Arthur, II.
23. Chicoutimi, IV.
25. Chicoutimi, IV ; Medicine Hat, IV.
21. Chicoutimi, IV ; Buda, IV ; Savanne, Gravenhurst, Father Point, IV ; Kingston, I ; Durham, II ; Truro, IV ; Battleford, IV ; Swift Current, II ; Minnedosa, III ; Fredericton, IV ; Alexandria, II.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF JANUARY, 1893.

HOURS ENDING

	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT				0 00	0 13	0 25	0 27	0 32	0 30	0 22	0 14	0 07	0 00			
AGASSIZ, R.C.				09	03	16	33	40	43	38	28	16	09			
BRANDON				00	17	37	41	47	53	57	47	28	8			
INDIAN HEAD				01	17	35	36	36	28	21	19	09	00			
WINNIPEG				03	45	49	51	54	49	15	49	19	00			
WOODBOCK				00	09	04	12	20	26	30	25	14	01			
TORONTO				10	24	33	35	42	40	31	21	17	9			
LINDSAY				01	16	22	28	28	32	38	29	17	08	8		
BARRE				00	03	09	20	27	30	28	17	11	00			
KINGSTON				07	26	34	38	38	45	42	31	23	8			
MONTREAL				00	11	19	37	46	50	52	33	06	00			
FREDERICTON				02	28	46	50	50	70	67	62	47	08			
SYDNEY				02	16	30	34	33	38	49	29	25	04			
				ESQUIMAULT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODBOCK.	TORONTO.	LINDSAY.	BARRE.	KINGSTON.	MONTREAL.	FREDERICTON.	SYDNEY.
MEAN PROPORTION FOR MONTH	0 19	0 25	0 35	0 22	0 30	0 15	0 27	0 24	0 16	0 31	0 34	0 48	0 26			
(Corrected sunshine being 1)																
MAXIMUM DAILY AMOUNT	0 76	0 85	0 80	0 82	0 81	0 66	0 88	0 89	0 72	1 00	0 33	0 90	0 92			
DAILY	2	8	14	7	12	19	6	3	15	6	30	12	23			
NO. OF DAYS COMPLETELY CLOUDED	13	10	8	14	9	17	8	9	10	9	12	8	10			

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 588. These were divided as follows:—

DISTRICT.	VERIFIED.				
	No. ISSUED.	No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA	94	60	20	14	74.5
LOWER LAKE REGION	113	86	20	7	85.0
UPPER ST. LAWRENCE	90	80	7	3	92.8
LOWER ST. LAWRENCE	94	82	6	6	90.1
QUEBEC	100	83	14	3	90.0
MARITIME PROVINCES	97	73	19	5	85.1
TOTAL	588	494	86	38	86.2

In order to obtain the percentage of verification of the predictions, the number partly verified divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer R. F. Stupart.

## STORM WARNINGS.

During the month warnings on the approach of five storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 83, of which 71 or 85·5 per cent., were verified. At four stations, however, the force did not reach that indicated by the signals displayed. Two stations reported warnings received late owing to delay in issue, and one station reported a storm for which no warning was sent.

In conjunction with the warnings, predictions as to the probable directions of the wind were given, and of the 71 warnings verified as to force, 71 or 100 per cent. were fully verified.

No. 1. At 10.35 a.m. all stations open to navigation in the Maritime Provinces were warned for a strong easterly gale in advance of a cyclone which was then over Ohio and moving northeastward. That night a heavy gale set in throughout the district, generally from the S. E. and S. shifting to westerly. The cyclone passed across the Gulf of St. Lawrence on the 3rd, when the storm abated.

No. 2. Signals for a strong easterly gale were ordered up at all eastern stations at 10.45 a.m. on the 5th. At the time a cyclone was off the Middle Atlantic States and moving up the coast. A heavy northeasterly gale set in during the 6th. The cyclone passed over the Gulf of St. Lawrence on the 7th, when the wind which had backed to the westward subsided.

No. 3. At 11 a.m. on the 9th signals for a strong easterly gale were ordered up throughout the Maritime Provinces in advance of a cyclone then over Lake Huron. From thence it moved northeastward, causing a fresh to heavy gale in the district warned on the 10th. The cyclone passed over the Gulf of St. Lawrence the next day when the wind, which had shifted to the westward, decreased in force.

No. 4. At 11.25 a.m. on the 10th, owing to a storm off the Carolina coast, all stations in the Bay of Fundy and up the Atlantic coast as far as the Gut of Canso were warned for a strong easterly gale. The cyclone, however, became unimportant and no storm occurred in this district.

No. 5. At 10 p.m. on the 28th all eastern stations were warned for a strong easterly gale in advance of a cyclone then central over Illinois. Next morning it was over the Georgian Bay and signals were changed for a strong westerly gale. The cyclone passed across the Gulf of St. Lawrence on the 30th, giving a fresh to strong gale along the Atlantic coast, but no storm was reported from the Bay of Fundy or Gulf Stations.

## TORONTO OBSERVATORY, MAGNETIC REVIEW FOR JANUARY, 1893.

The month was entirely free from any important storm, in fact it was the quietest we have had for a long period.

Slight disturbing action was shewn during the first seven days. The movements on the 5th were the most pronounced, during the afternoon the changes being very rapid. On the evening of the 8th the magnets again became unsteady and continued so until the night of the 14th when they resumed their normal position. A striking similarity is shewn in some of the movements during the 12th, 13th and 14th. On the night of the 16th slight disturbing action again set in, and during the following week the magnets were seldom at rest. The movements on the morning of the 22nd were the most conspicuous. From the 23rd to the 28th the magnets were quiet. A slight disturbance prevailed on the 29th and was followed by a quiet period lasting up to the end of the month.

On the 11th auroral light and streamers at 11 p.m., Class III. On the 2nd, 6th, 7th, 10th, 12th, 14th, 19th, 20th, 21st and 29th the sky was clear but no aurora was observed, on all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL

*Director.*

METEOROLOGICAL OFFICE,

Toronto, March 18th, 1893.





# METEOROLOGICAL SERVICE, DOMINION OF CANADA.

## Monthly Weather Review.

### FEBRUARY, 1893.

#### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

#### ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraphic reporting stations, was slightly below the normal of nineteen years in the Maritime Provinces, and in Quebec as far west as the mouth of the St. Lawrence. Elsewhere it was slightly above the normal at nearly all stations.

The area of mean atmospheric pressure of greatest departure below normal lay off our Atlantic coast, and embraced Newfoundland, while there were two well marked belts of high pressure above normal, the lesser one over and to the northward of the Ottawa Valley, and the other the more important over Alberta and its immediate vicinity. The country included in the greatest high pressure departures, showed the largest difference below normal temperature. Rockcliffe, in the first named district, gave  $10^{\circ}$  below normal, and in the other one Calgary recorded  $8^{\circ}$  below, and Swift Current  $7^{\circ}$  below. Temperature, however, was much below its average throughout Canada, the smallest amount below, and this was over Prince Edward Island, exceeded  $2^{\circ}$ . The greater number of the low areas passed from the Southwest States to the Lake Region, and then down the St. Lawrence Valley, the average rate of movements was 38.8 miles per hour, being about the average February rate. The most remarkable feature of the month was the great anti-cyclonic conditions which prevailed during the first week over our North-west Territories and British Columbia, attended there by some of the most severe weather ever experienced,  $-50^{\circ}$  was recorded on several occasions, and Prince Albert gave the phenomenally low reading of  $-70^{\circ}$ .

1st, 8th.—This period was one of unusually important anti-cyclonic conditions over the greater portion of Canada; the only interruptions in these conditions occurred from the Lakes to the Atlantic on the 3rd, when the passage of a shallow depression gave a moderate snowfall in most places, as well as a gale at some of our coast stations, and again on the 6th in Ontario and Quebec, and on the 7th in the Maritime Provinces a depression from the Southwest States, of more energy than its predecessor, gave a fall of snow or rain, the latter being quite heavy along the Nova Scotian coast, where a gale was also experienced in many places. In the North-west Territories and Manitoba, the weather throughout was very severe, Calgary had  $-49^{\circ}$  and Prince Albert  $-70^{\circ}$ . Strong winds were of frequent occurrence, and on the 5th snow fell heavily in nearly all districts. From the Lakes to the Atlantic, except during the presence of the depressions already spoken of, the weather was for the most part fine and decidedly cold and temperatures of about zero, and some degrees below were often and generally experienced.

The passage of a slight depression over the Territories and Manitoba between the night of the 8th, and on the 9th raised the temperature there a little above zero. The depression then became absorbed by a rather deep disturbance which moved from the Southwest States into the Lake Region, where it gave snow turning to rain, and on the following day the 10th, during its advance to the Atlantic, there was snow and rain in Quebec and heavy rains in the Maritime Provinces. High winds were also felt in many places.

High pressure and fine cold weather again obtained in Manitoba and the Territories on the 10th. These conditions spread quickly over the remainder of Canada, and a short period of pleasant wintery weather ensued.

On the 12th in the Territories, and the next day in Manitoba, whilst a depression was passing to the southward, a fall of snow as a rule light, was occasioned in nearly all places. The depression eventually traversed the Lake Region and Eastern Canada, where its presence was marked by a general rain, which occurred on the 14th in Ontario, and the same night and early next morning in Quebec and the Maritime Provinces. Prior to this, during the night of the 13th, when another depression was passing up the Atlantic, snow fell heavily along the Nova Scotian coast.

The high pressure and decidedly cold weather, which at first succeeded the snowfall in the North-west, gave way almost at once to more normal temperature and pressure, but on the evening of the 15th what proved to be a more important high pressure system passed down from the northward over Manitoba and during its subsequent advance to the Atlantic, between the 15th and 17th, it gave fine and decidedly cold weather. Some of the minima recorded were, Winnipeg —33, Parry Sound —21, Rockliffe —35, Quebec —12, Halifax —2.

Light snow showers accompanied a slight depression across the Territories and Manitoba during the 17th, and the same night and on the 18th a moderate disturbance from the South-west States, skirting the Lake Region and passing north-eastward, gave a fairly heavy snowfall in nearly all localities from the Lakes to the Atlantic.

10th, 28th. The distribution of pressure, from the Lakes to the Atlantic, during this period was mainly cyclonic, no less than three important low pressure areas, besides several minor ones, having passed over or affected some portion of the country. The first of the three deep disturbances, had its principal, if not primary development, over the Lake Region on the 19th. It quickly became a severe storm and moved over the Maritime Provinces with its centre below 28.80 inches at sea-level. The second large disturbance was developed by the union of two small depressions, one from the South-west, the other from the North-west, the barometer reduced to sea-level in its centre when over the Maritime Provinces, reading below 29.00 inches. The third important disturbance travelled from the South-west States to Lake Superior with a reduced barometer in its centre of 29.10 inches. The weather under existing conditions was, as a result, often very unsettled and stormy, and some heavy gales were experienced, noticeably those of the 19th, from the Lakes to the Atlantic, and the ones over Eastern Canada on the 22nd. Moderate snowfalls occurred in nearly all localities on the 19th; on the 21st there was a light snow over the Lake Region, extending to the St. Lawrence by the next day, also on the 22nd rain and snow fell heavily in the Maritime Provinces. On the 23rd there was heavy snow in the Lake Region, chiefly confined to the southern portion. Occasional light local snow was experienced between the 24th and 25th in Eastern Canada, and on the 28th snow and rain fell in the Lake and St. Lawrence Regions. The most widespread fine weather occurred between the 26th and 27th, during the presence of a rather important anti cyclone. Temperature was as a rule below its average, especially in Ontario and Quebec, and minima near to or below zero were very general on the 21st, the 25th and the 27th.

In the North-west Territories and Manitoba, during this protracted interval, the distribution of pressure was partly cyclonic and partly anti-cyclonic, but at no time were either the high or low areas of much energy, consequently the winds were on the whole, moderate or light. The weather was as a rule fine, but there were at times light scattered snowfalls, chiefly on the 20th, between the 22nd and 23rd, and also between the 26th and 28th. Temperature was at no time extremely low and was generally above its average.

#### TEMPERATURE.

The average temperature, as determined from the observations taken at telegraph reporting stations, was below the normal of nineteen years at all stations. The greatest difference from normal was at Rockliffe, where it amounted to between 10° and 11°.

*The Highest and Lowest Temperatures in each Province during February were:*

British Columbia, 61°.5 on 17th at Port Simpson; —46° 0 on 2nd at Barkerville.

North-west Territories, 45° 1 on 21st at Calgary; —70° 4 on 1st at Prince Albert.

Manitoba, 33° 4 on 20th at Minnedosa; —52° 0 on 1st at Brandon.

Ontario, 50° 0 on 13th at Sudbury; —53° 0 on 2nd at Buda.

Quebec, 42° 0 on 10th at St. Hyacinthe and Bromie; —33° 0 on 5th at Richmond.

New Brunswick, 46° 9 on 15th at Fredericton; —24° 5 on 9th at Chatham.

Nova Scotia, 45° 0 on 10th at Pictou; —10° 0 on 5th at Whitehead.

Prince Edward Island, 43° 8 on 11th at Georgetown; —18° 9 on 7th at Charlottetown.

Mr. Smith, the observer at Alexandria, Ont., records that on the 26th a slight shock of an earthquake was felt at 9.36 p.m. standard time.

The weather in British Columbia during the early part of the month was extremely severe temperature very low, accompanied by strong winds and heavy snow and drift, birds frozen to death. Mr. E. B. Webster, the observer at Keremeos, says the severe cold, lasting from January 25th to February 6th, is the worst ever remembered by the Indians, being accompanied by strong wind the whole time. There will be a heavy loss of cattle and horses as hay is now very scarce and selling at from \$40 to \$100 per ton. The Indians are losing most of their horses for which they never provide any food other than the natural mountain pasture.

N.W. TERRITORIES:	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				DIRECTION OF WIND FROM.				VELOCITY OF WIND.				PRECIPITATION.																		
	Mean reduced.		Range.		Mean.		Diff. from aver.		Date.		Highest.		Lowest.		Mean daily range.		Greatest daily range.		No. of days completely clouded.																
	in.	in.	in.	in.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°															
	Mean actual.	Lowest.	Range.	Mean.	Diff. from aver.	Years observ.	Highest.	Date.	Lowest.	Date.	Lowest.	Mean daily range.	Greatest daily range.	Mean temperature of dewpoint.	Mean relative humidity.	Mean amount of cloud.	No. of days completely clouded.	N.	E.	S.	W.	N.W.	C.	Total number of hours.	Mean, miles per hour.	Highest days.	Direction.	Date and time.	Amount.	Diff. from aver.	No. of days.	No. of fair days.	No. of Auroras.	No. of Thunder storms.	No. of Fogs.
Medicine Hat.....	30-28 31-07 29-73	1-34	1-34	1-6	8-5	9-37	8	19	-49-2	1	18-4 50-6	1	18-4 50-6	6	4	5	3	2	0	5	11	23	7	5	56	18-9	22 NW	18-9	0-76	-0-26	8-20	0	0	0	0
Edmonton.....	30-22 31-29 29-69	1-54	3-3	3-3	2-3	10-44-0	21	27-0	3	18-338-0	3	18-338-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Prince Albert.....	30-16 31-15 29-69	1-40	1-40	1-8	4-6	10-44-0	13	70-4	1	12-0 40-2	1	12-0 40-2	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Indian Head.....	30-21 31-25 29-81	1-44	1-44	1-1	0-8	11-32	18	22-0	1	17-0 30-9	1	17-0 30-9	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Swift Current.....	30-27 31-15 29-35	1-47	1-47	1-1	0-8	11-32	18	22-0	1	17-0 30-9	1	17-0 30-9	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Qu'Appelle.....	30-27 31-15 29-35	1-47	1-47	1-1	0-8	11-32	18	22-0	1	17-0 30-9	1	17-0 30-9	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Wadena.....	30-19 28-80 27-85	1-01	1-01	1-3	1-3	23-00	19	25-0	1	23-0 28-0	1	23-0 28-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Regina.....	30-16 31-01 29-70	1-31	1-31	1-5	1-5	10-33-4	22	49-8	1	20-0 32-2	1	20-0 32-2	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Henrietta.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Calgary.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Chaplin.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Saskatoon.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Banff.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Calgary.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Edmonton.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0	1	6	11	33	7	5	56	12-0	27 NW	12-0	0-20	-0-47	8-20	0	0	0	0
Fort McMurray.....	30-31 31-18 29-72	1-47	1-47	1-0	1-0	13-01	22	45-4	1	18-0 30-0	1	18-0 30-0	6	4	5	3	2	0																	



**(ONSTAR) — Conclusion.**

[illegible]

## PRECIPITATION.

The rainfall throughout the Dominion has been small and in general considerably below the average.

*The General Distribution is as follows :—*

In British Columbia the rainfall on the coast 1·32 in. In the interior little has fallen.

In the North-west Territories no rain has fallen.

In Manitoba no rain is recorded except a few drops at one or two stations about the 21st.

In Ontario, West and South-west District it was 1·15 in., or 0·09 in. above the average. In the North and North-west District it was 0·30 in., or 0·24 in. below the average. In the Central District it was 1·05 in.; or 0·40 in. above the average; and in the East and North-east District it was 0·44 in.; or 0·25 in. below the average.

In Quebec it was 0·64 in., or 0·31 in. above the average.

In New Brunswick it was 0·92 in., or 0·47 in. below the average.

In Nova Scotia it was 1·86 in., or 0·16 above the average.

In Prince Edward Island it was 0·56 in., or 0·24 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

British Columbia.—Port Simpson, 5·53.

*Rainfall 1 inch and upwards in 24 hours :—*

BRITISH COLUMBIA.—24th, Port Simpson, 1·60 in.

ONTARIO.—6th, Stoncy Creek, 1·02 in.; Lyons, 1·09 in.; Thedford, 1·44 in.; London, 1·55 in.; 10th, Welland, 1·10 in.; 14th, Presque Isle, 1·00 in.

QUEBEC.—14th, St. Hyacinthe, 1·00 in.

NOVA SCOTIA.—7th, Yarmouth, 1·18 in.; 10th, Digby, 1·00 in.; Halifax, 1·10 in.; Yarmouth, 1·68 in.

NEWFOUNDLAND.—24th, St. Johns, 1·00 in.

## SNOWFALL.

The snowfall throughout Canada has been large and in some districts excessive in amount. The distribution is as follows :

BRITISH COLUMBIA. On the coast a large quantity has fallen in the beginning of the month, a continuation of the very stormy weather which prevailed from the 28th January and which is stated to have been the coldest and most severe storm ever experienced there.

In the N. W. TERRITORIES about 6·6 in. has fallen, or about 2·0 in. above the average.

In MANITOBA 13·1 in. has fallen, or about 10 in. above the average.

In the DISTRICTS OF ONTARIO, the amount is 2·39 in., or 10·4 in. above the average; 2·3·6 in., or 9·1 in. above the average; 2·8·4 in., or 16·5 in. above the average; 2·11 in., or 5·3 in. above the average.

In QUEBEC 22·5 in. or 2·8 in. above the average.

In N. BRUNSWICK 27·3 in. or 5·0 in. above the average.

In NOVA SCOTIA 23·7 in. or 5·1 in. above the average.

In P. E. ISLAND 14·8 in. or 7·9 in. below the average.

*Snowfall 15 in. and upwards during month :—*

BRITISH COLUMBIA. Esquimalt, 37 in.; Port Simpson, 15 in.; French Creek, 36 in.; Abbotsford, 27 in.; Quamicham, 59 in.; Agassiz, 43 in.; Nanaimo, 41 in.; Loch Erroch, 19 in.; Griffin's Lake, 42 in.; Chilcotin, 16 in.; Fort Steele, 16 in.; Barkerville, 22 in.

MANITOBA. Rapid City, 26 in.; Brandon, 17 in.; Hartney, 20 in.; Clandeboye, 22 in.; Posen, 20 in.; Pilot Mound, 15 in.; Elkhorn, 16 in.; Winnipeg, 15 in.

ONTARIO. Alexandria, 18 in.; Coldwater, 20 in.; Little Forks, 24 in.; Durham, 38 in.; London, 28 in.; Deseronto, 27 in.; Guelph, 24 in.; Parry Sound, 20 in.; Port Stanley, 41 in.; Port Arthur, 20 in.; Saugeen, 29 in.; Kingston, 21 in.; Ottawa, 26 in.; Port Dover, 34 in.; Shannonville, 19 in.; Welland, 54 in.; Buda, 33 in.; Novar, 20 in.; Sudbury, 19 in.; Savanne, 20 in.; Chapleau, 26 in.; Nipigon, 28 in.; Uplands, 20 in.; Owen Sound, 35 in.; Whiteside, 24 in.; Beatrice, 27 in.; St. George, 23 in.; Point Clark, 26 in.; Elora, 23 in.; Gravenhurst, 25 in.; Mattawa, 17 in.; Alton, 30 in.; Egremont, 20 in.; Barrie, 24 in.; Toronto, 31 in.; Orillia, 25 in.; Ridgetown, 17 in.; St. Mary's, 38 in.; Brimam, 38 in.; Stoncy Creek, 27 in.; Bancroft, 20 in.; Lindsay, 25 in.; Chatham, 23 in.; Galt, 28 in.; Sault St. Marie, 21 in.; Norwood, 25 in.; Peterborough, 30 in.; Sombra, 27 in.; Hali-burton, 28 in.; Niagara Falls S., 25 in.; Paris, 22 in.; Bognor, 31 in.; Sharon, 18 in.; De Cewsville,

26 in.; Cottam, 27 in.; Axe Lake, 18 in.; Clontarf, 33 in.; Conestogo, 34 in.; Lucknow, 27 in.; Lakefield, 25 in.; Georgina, 18 in.; Sprucedale, 30 in.; Goderich, 40 in.; Lyons, 27 in.; Schrieber, 26 in.; Fergus, 31 in.; Georgetown, 39 in.; Midland, 26 in.; Cartier, 21 in.; Coldstream, 28 in.; Sunshine, 22 in.; Orangeville, 38 in.; Sarnia, 16 in.; Port Hope, 31 in.; Thompson, 24 in.; Presque'Isle, 34 in.; Wyoming, 18 in.; Cowal, 25 in.; Deer Park, 19 in.; Thedford, 33 in.; Aurora, 15 in.; Barclay, 17 in.; Wiarton, 15 in.; St. Thomas, 30 in.; Burk's Falls, 25 in.; Princeton, 34 in.; Denbigh, 33 in.; Scarborough, 24 in.; Mount Forest, 31 in.; Wilton Grove, 18 in.; Cayuga, 31 in.

QUEBEC.—Richmond, 29 in.; Cape Magdalene, 19 in.; Point des Monts, 15 in.; St. Hyacinthe, 62 in.; Quebec, 15 in.; Montreal, 21 in.

NEW BRUNSWICK.—Chatham, 19 in.; Grand Manan, 32 in.; Point Lepreaux, 34 in.; Dorchester, 18 in.; Dalhousie, 19 in.; St. John, 27 in.; Point Escuminac, 25 in.

NOVA SCOTIA.—Pictou, 22 in.; Digby, 32 in.; Halifax, 34 in.; Yarmouth, 41 in.

PRINCE EDWARD ISLAND.—Georgetown, 15 in.; Charlottetown, 18 in.

NEW FOUNDLAND.—St. Johns, 31 in.; Channel, 23 in.

*Snowfall 4 inches and upwards in 24 hours:—*

1. Rapid City, 10 in.; Fergus, 4 in.; Missanabie, 6 in.; Stoney Creek, 4 in.; Quamichan, 9 in.; Esquimalt, 10 in.

2. Bancroft, 7 in.; Beatrice, 6 in.; French Creek, 12 in.; Nanaimo, 11 in.; Gravenhurst, 4 in.; Midland, 5 in.; Pilot Mound, 4 in.; Savanne, 5 in.; Chapleau, 4 in.; Cottam, 4 in.; St. Hyacinthe, 14 in.; Abbotsford, 13 in.; Sudbury, 4 in.; Esquimalt, 9 in.

3. Barrie, 5 in.; Galt, 4 in.; Sault Ste. Marie, 6 in.; St. George, 4 in.; Point Clark, 5 in.; Elora, 4 in.; Novar, 5 in.; Digby, 4 in.; Nanaimo, 4 in.; Whitehead, 6 in.; Point Lepreaux, 6 in.; Richmond, 8 in.; Presque'Isle, 12 in.; Orangeville, 5 in.; Denbigh, 7 in.; Ennismore, 4 in.; Burk's Falls, 11 in.; Sprucedale, 11 in.; Norwood, 6 in.; Orillia, 4 in.; Haliburton, 4 in.; Renfrew, 6 in.; Shannonville, 4 in.; Uplands, 5 in.; Clontarf, 12 in.; Axe Lake, 8 in.; Lakefield, 5 in.; Owen Sound, 6 in.; Whiteside, 5 in.; Goderich, 4 in.; Agassiz, 18 in.; Quamichan, 12 in.; Griffin Lake, 7 in.; Sudbury, 6 in.; Esquimalt, 5 in.; Alexandria, 6 in.; Coldwater, 9 in.; Durham, 6 in.; Ottawa, 8 in.; Parry Sound, 5 in.; Rockliffe, 4 in.; Grand Manan, 9 in.; Saugeen, 5 in.; Quebec, 6 in.; Port Dover, 5 in.; Lindsay, 7 in.

4. Pictou, 4 in.; French Creek, 6 in.; Port Hastings, 6 in.; Thompson, 4 in.; Sunshine, 4 in.; Owen Sound, 4 in.

5. Posen, 5 in.; Digby, 5 in.; Oakbank, 4 in.; Cotham, 4 in.; French Creek, 4 in.; Nanaimo, 10 in.; Claudeboye, 4 in.; Fort Steele, 4 in.; Little Forks, 4 in.; Winnipeg, 4 in.

6. Bancroft, 4 in.; Dalhousie, 5 in.; French Creek, 6 in.; Richmond, 4 in.; Denbigh, 5 in.; Cartier, 4 in.; St. Hyacinthe, 12 in.; Clontarf, 5 in.; Quamichan, 9 in.; St. Johns, Nfld., 10 in.

7. Point Clark, 6 in.; Pictou, 4 in.; French Creek, 7 in.; Nanaimo, 5 in.; Channel, Nfld., 9 in.; Esquimalt, 6 in.; Point Escuminac, 4 in.; Port Hope, 4 in.; Mount Forest, 7 in.; St. Hyacinthe, 8 in.; Quamichan, 6 in.; Ottawa, 4 in.

8. Wiarton, 4 in.; Presque'Isle, 6 in.

9. Bancroft, 7 in.; Chatham, 4 in.; Conestogo, 5 in.; Egremont, 4 in.; Galt, 6 in.; Sault Ste. Marie, 4 in.; Beatrice, 6 in.; Point Clark, 8 in.; Elora, 6 in.; Point des Monts, 5 in.; Gravenhurst, 7 in.; Cowal, 6 in.; Presque'Isle, 6 in.; Sarnia, 5 in.; Dealtown, 4 in.; Denbigh, 6 in.; St. Thomas, 7 in.; Burk's Falls, 6 in.; Georgetown, 5 in.; Midland, 5 in.; Cayuga, 5 in.; Alton, 6 in.; Mattawa, 4 in.; Sombra, 9 in.; Orillia, 6 in.; Chapleau, 4 in.; St. Hyacinthe, 9 in.; Ridgetown, 4 in.; Lyons, 7 in.; Birnam, 4 in.; Durham, 6 in.; Deseronto, 5 in.; Port Stanley, 9 in.; Port Dover, 5 in.

10. Esquimaux Point, 5 in.; Sault Ste. Marie, 6 in.; St. George, 7 in.; Novar, 4 in.; Richmond, 6 in.; Orangeville, 8 in.; Coldstream, 5 in.; Princeton, 7 in.; Fergus, 9 in.; Sprucedale, 6 in.; Haliburton, 5 in.; Shannonville, 4 in.; Lucknow, 7 in.; Owen Sound, 4 in.; Whiteside, 6 in.; St. Mary's, 5 in.; Goderich, 7 in.; Port Simpson, 5 in.

11. Chicoutimi, 5 in.; Thompson, 6 in.; Griffin Lake, 7 in.

12. Loch Erroch, 8 in.; Barkerville, 6 in.

13. Rapid City, 4 in.; Hillview, 8 in.; Claudeboye, 5 in.; Winnipeg, 4 in.

14. Pictou, 4 in.; Digby, 4 in.; Whitehead, 6 in.; Point Lepreaux, 5 in.; Norquay, 4 in.; Griffin Lake, 7 in.; Chilcotin, 12 in.; Barkerville, 4 in.; Port Simpson, 4 in.; Halifax, 11 in.; Yarmouth, 6 in.

15. Nanaimo, 6 in.; Whitehead, 9 in.; Agassiz, 15 in.; Quamichan, 7 in.; Griffin Lake, 17 in.

16. Sarnia, 6 in.

17. Aurora, 5 in.; Port Hope, 6 in.; Coldstream, 4 in.; St. Thomas, 4 in.; Fergus, 4 in.; Georgetown, Ont., 5 in.; Peterboro', 5 in.; Pelee Island, 4 in.; Stoney Creek, 4 in.

18. Chatham, 5 in.; Conestogo, 8 in.; Thedford, 7 in.; Deer Park, 6 in.; Wyoming, 6 in.; Port Hope, 12 in.; Orangeville, 9 in.; Princeton, 8 in.; Mount Forest, 5 in.; St. Thomas, 4 in.; Georgetown, 7 in.; Cottam, 4 in.; Welland, 6 in.; St. Mary's, 5 in.; Goderich, 4 in.; Birnam, 4 in.; Woodstock, 4 in.; Durham, 1 in.; Yarmouth, 11 in.; Saugeen, 5 in.; Wilton Grove, 4 in.; Alton, 8 in.; Norwood, 5 in.; Sombra, 4 in.; Niagara Falls, S., 4 in.; Paris, 4 in.

19. Bancroft, 4 in.; Point Clark, 7 in.; Whitehead, 8 in.; Gravenhurst, 5 in.; Wiarton, 4 in.; Presque Isle, 4 in.; Thompson, 7 in.; Coldstream, 4 in.; Denbigh, 5 in.; Ennismore, 4 in.; Georgetown, 4 in.; Midland, 5 in.; Haliburton, 4 in.; Bognor, 4 in.; Shannonville, 6 in.; St. Hyacinthe, 4 in.; Clontarf, 5 in.; Welland, 18 in.; St. Mary's, 6 in.; Goderich, 10 in.; Lyons, 4 in.; Coldwater, 7 in.; Durham, 12 in.; Deseronto, 8 in.; Ottawa, 6 in.; Parry Sound, 4 in.; Port Stanley, 14 in.; Saugeen, 4 in.; Kingston, 6 in.; Port Dover, 4 in.

20. Posen, 6 in.; Picton, 4 in.; Digby, 5 in.; Dorchester, 6 in.; Channel, 6 in.; Point Escuminac, 5 in.; Point Lepreaux, 12 in.; Thedford, 7 in.; Norwood, 6 in.; Paris, 4 in.; Lucknow, 5 in.; Lakefield, 5 in.; Owen Sound, 4 in.; Birnam, 5 in.; White River, 4 in.

21. Chatham, 4 in.; Georgetown, P. E. I., 4 in.; Cape Magdalen, 6 in.; Whitehead, 5 in.; Cowal, 4 in.; Clamdeboye, 5 in.; Owen Sound, 5 in.

22. Brome, 5 in.; Picton, 4 in.; Digby, 12 in.; Point Lepreaux, 6 in.; Richmond, 6 in.; St. Thomas, 10 in.; Pilot Mound, 4 in.; Sombra, 4 in.; Cottam, 5 in.; St. Hyacinthe, 7 in.; Welland, 4 in.; London, 5 in.; Chatham, 6 in.; Yarmouth, 6 in.; Charlottetown, 4 in.; Grand Manan, 12 in.

23. Chatham, 5 in.; Egremont, 5 in.; Galt, 6 in.; St. George, 10 in.; Wanstead, 6 in.; Elora, 5 in.; London, 6 in.; Dalhousie, 8 in.; Point Escuminac, 10 in.; Cape Magdalen, 10 in.; Whitehead, 8 in.; Thedford, 9 in.; Cowal, 8 in.; Wyoming, 8 in.; Port Hope, 6 in.; Coldstream, 6 in.; Dealtown, Georgetown, 6 in.; Wilton Grove, 11 in.; Cayuga, 10 in.; Morden, 4 in.; Gretna, 5 in.; Alton, 6 in.; St. Mary's, 5 in.; Goderich, 8 in.; Lyon, 9 in.; Birnam, 6 in.; Stoney Creek, 12 in.; Halifax, 6 in.; Charlottetown, 4 in.; Port Stanley, 5 in.

24. Conestogo, 10 in.; Deer Park, 7 in.; Orangeville, 6 in.; Princeton, 10 in.; Niagara Falls, S., 10 in.; Paris, 8 in.; Cottam, 6 in.; Welland, 10 in.; Barkerville, 4 in.; DeCewsville, 8 in.; Woodstock, 6 in.; Guelph, 4 in.; Port Dover, 4 in.

25. Thompson, 4 in.; St. Thomas, 7 in.; Cayuga, 10 in.; St. Johns, Nfld., 8 in.

26. St. Johns, Nfld., 6 in.

27. Buda, 5 in.; Nepigon, 6 in.

28. Schriber, 6 in.; Sault Ste. Marie, 6 in.; Buda, 18 in.; Sprucedale, 4 in.; Cartier, 6 in.; Savanne, 10 in.; Chappleau, 4 in.; Heron Bay, 4 in.; Nepigon, 14 in.; Sudbury, 4 in.; Port Arthur, 10 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

3. Cotham, Channel Island, IV; Minnedosa, IV.

4. Henrietta, II; Saskatoon, II; Bancroft, II; Barrie, IV; Conestogo, Beatrice, III; Elora, Dorchester, Gravenhurst, IV; Novar, III; Georgetown, III; Midland, IV; Alton, II; Peterboro', I; Sombra, III; Haliburton, II; Savanne, Sharon, II; Uplands, Clontarf, III; Welland, II; Lucknow, Alexandria, I; Coldwater, IV; Port Simpson, II; Winnipeg, IV; Halifax, IV; Ottawa, IV; Father Point, III; Kingston, IV; Quebec, III; Toronto, III.

5. St. Albans, III; Henrietta, III; Chicoutimi, IV; Bancroft, II; Posen, IV; Cotham, I; Dorchester, Gravenhurst, IV; Richmond, IV; Denbigh, II; Pembina Crossing, IV; Sharon, II; Clontarf, IV; Stoney Creek, IV; Alexandria, I; Coldwater, IV; White River, IV; Father Point, II; Minnedosa, IV; Kingston, IV; Ottawa, IV; Quebec, IV.

6. Posen, II; Georgetown, P.E.I., Savanne, Channel Island, IV; Port Simpson, IV; Minnedosa, IV.

7. Hillview, Buda, II.

8. Chicoutimi, IV; Posen, III; Savanne, Port Simpson, IV; Father Point, IV; Prince Albert, I; Minnedosa, III.

9. Posen, I; Oak Bank.



13. Rapid City, Dorchester.

14. Buda, III ; Oak Bank, Cotham, I ; Glenbow, IV ; Georgetown, P.E.I., Dorchester, Pembina Crossing, IV ; Savanne Fort Francis, Little Forks, IV ; Minnedosa, III ; Edmonton, III ; Quebec, IV.

15. Hillview, St. Albans, I ; Chicoutimi, III ; Barrie, IV ; Banff, IV ; Posen, I ; Chatham, IV ; Galt, Channel Island, I ; Durham, IV ; Spence's Bridge, IV ; Kingston, IV ; Quebec, IV ; Beatrice, IV ; Wantead, *very bright* ; Elora, *very bright* ; Dalhousie, N.B., Buda, II ; Sharon, II ; Belmont, *brilliant* ; Pembina Crossing, IV ; Peterboro', IV ; Sombra, III ; Savanne, I ; Cottam, Elkhorn, III ; Glenbow, II ; Georgetown, P.E.I., Dorchester, I ; Gravenhurst, IV ; Georgetown, Ont., III ; Fort Francis, Lucknow, Ridgetown, Birnam, III ; Stoney Creek, II ; Yarmouth, IV ; Charlottetown, IV ; Father Point, III ; Port Arthur, II ; Toronto, III ; St. Andrews, IV.

16. St. Albans, IV ; Henrietta, II ; Saskatoon, I ; Chicoutimi, IV ; Barrie, IV ; Dorchester, Gravenhurst, IV ; Novar, Pembina Crossing, IV ; Uplands, Lucknow, Birnam, IV ; Alexandria III ; Wallace, III ; Durham, IV ; White River, II ; Father Point, IV ; Minnedosa, I ; Quebec, IV.

17. Hillview, St. Albans, III ; Henrietta, II ; Saskatoon, II ; Chicoutimi, III ; Posen, II ; Elkhorn, II ; Cotham, II ; Dorchester, Cape Chatte, Calvin, IV ; Belmont, Pembina Crossing, III ; Charlottetown, IV ; Grand Mannan, IV ; St. Johns, Nfld., III ; Quebec, IV.

18. Posen, IV ; Elkhorn, I ; Cotham, I ; Calvin, IV ; Pembina Crossing, IV ; Channel Island, IV ; Wallace, II ; Prince Albert, III ; Minnedosa, II ; Edmonton, III.

19. Buda, III ; Savanne, Minnedosa, III.

26. Little Forks, III.

28. Port Simpson.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF FEBRUARY, 1885.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....				0 01	0 09	0 15	0 23	0 23	0 18	0 19	0 13	0 18	0 05			
AGASSIZ, B.C.....				00	09	21	24	39	31	24	18	10	02			
BRANDON.....				07	36	50	55	56	46	53	48	42	18			
INDIAN HEAD.....				03	16	39	36	43	46	48	44	38	12			
WINNIPEG.....			01	22	53	62	61	62	56	51	44	41	14			
WOODSTOCK.....				08	14	24	28	36	39	42	44	40	29	04		
TORONTO.....				13	31	33	40	38	40	44	51	45	32	5		
LINDSAY.....				08	24	38	37	45	42	40	36	33	28	19		
BARRIE.....				08	14	35	49	36	43	36	45	34	23	5		
KINGSTON.....			S	29	29	34	41	32	40	38	39	38	22			
MONTREAL.....				05	39	44	39	43	47	55	51	30	02			
FREDERICTON.....				16	36	49	55	64	62	61	56	50	42	05		
SYDNEY.....																
MEAN PROPORTION FOR MONTH.....	0 11	0 15	0 41	0 31	0 47	0 29	0 35	0 33	0 31	0 32	0 40	0 48				
(Constant sunshine being 1.)																
MAXIMUM DAILY AMOUNT.....	0 70	0 73	0 81	0 77	0 85	0 89	0 89	1 00	0 85	0 92	0 95	0 92				
DATE.....	25	12	14	24	1	29	26	29	4	4	25	25				
NO. OF DAYS COMPLETELY CLOUDED.....	16	14	6	11	6	11	7	8	7	10	7	8				

## PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 547. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	79	57	5	13	77.8
LOWER LAKE REGION .....	96	72	16	8	83.8
UPPER ST. LAWRENCE .....	92	68	13	11	81.0
LOWER ST. LAWRENCE .....	93	72	10	11	82.8
GULF .....	90	72	8	10	84.4
MARITIME PROVINCES .....	97	65	19	13	76.8
TOTAL .....	547	496	75	66	81.1

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer R. F. Stupart.

### STORM WARNINGS.

During the month warnings on the approach of four storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 60, of which 57 were verified. At six stations, however, the force did not reach that indicated by the signals displayed. Ten stations reported warnings received late, six owing to delay in issue, and four to delay in transmission, and two stations reported a storm for which no warning was sent.

1. At 10.05 p.m. of the 3rd storm signal No. 4 for a heavy southwest to northwest gale was ordered for stations in the Maritime Provinces open to navigation, there being a developing depression near the mouth of the Bay of Fundy, and an important anti-cyclone west of the Lakes. Next day the depression passed east and a decided north-westerly gradient set in, causing a very cold north west gale at almost all stations lasting from early morning until night. Signals were lowered during the evening of the 4th.

2. On the morning of the 6th there was a developing depression over the Lake Region, and at 10.50 a.m. Signal No. 3 indicating a heavy easterly, veering to south-westerly gale was ordered for the Maritime stations. The storm centre moved across the St. Lawrence Valley and Gulf of St. Lawrence, and by the morning of 8th had passed to the east of Newfoundland. A moderate to fresh south-easterly to south-westerly gale prevailed at most points during the evening and night of the 6th, but the storm was by no means heavy. Signals were lowered on the 7th.

3. On the evening of the 17th a developing depression extended from the Lower Lakes to the Middle Atlantic Coast, and at 10.15 p.m. Signal No. 3 for a gale, at first from the eastward, was ordered for the Maritime Provinces. The storm centre moved eastward causing stormy weather off the west coast of Nova Scotia during the 18th. An important storm centre developed over the Lake Region on the 6th, moved to Maine, and thence on 20th and 21st north-eastward across New Brunswick, and the Gulf of St. Lawrence; early on the 20th Signal No. 4, indicating a westerly gale was ordered for the Maritime Provinces. Heavy easterly gales prevailed generally in the Maritime Provinces during the 20th, and on the 21st strong north-westerly gales prevailed with heavy drift. Safety messages were despatched at 8.10 a.m. 21st.

4. On the morning of the 22nd there was an important storm centre near Long Island and at 10.15 a.m. signals indicating a heavy gale to veer from east through south to south-west were ordered for the Maritime Provinces. The storm centre moved very quickly to the Bay of Fundy, and thence across the Gulf of St. Lawrence. A fresh to heavy gale began early in the afternoon in the western part of the Maritime Provinces, and before night prevailed generally; the heaviest blow at all points was from the south-east and east, and was accompanied by rain. Signals were lowered during the forenoon of the 23rd.

## TORONTO OBSERVATORY—MAGNETIC REVIEW FOR FEBRUARY, 1893.

There was nothing of importance registered until the evening of the 4th. After 7 p. m. the declination magnet moved east and remained considerably east of its mean position until midnight, the extreme easterly limit being reached at 10.43 p.m., after which slow waves of disturbance appeared, the magnet gradually resuming its normal position. Between 6 and 9 p.m. the vertical component increased considerably and fell up to midnight. All morning of the 5th the magnets were disturbed and an increase in the movements took place during the evening. On the morning of the 6th slight disturbing action appeared and was visible up to the evening of the 8th. A steady magnet then followed but slight disturbing action again appeared on the evening of the 9th. On the 10th a quiet period set in and lasted up to the 13th. Small changes were going on all next day, and after 8 p. m. of the 15th they became more important. After 8 p. m. a rapid easterly swing set in, followed immediately by a westerly deflection. Sharp changes were going on during the night of the 15th. A sudden increase of the horizontal force was noticed on the 13th at 10.17 p.m. Slight disturbance continued from the 16th to the 22nd, the most important change being an easterly swing of the declination magnet just previous to 6 p. m. of the 16th. From the 22nd to the 27th slight movements would occasionally appear and the month closed with a steady magnet.

On the 4th aurora was visible all evening, some of the waves darting to zenith. On the 15th auroral arch and some streamers from 7 to 9.30 p. m. clouded over rapidly after 9.30 p.m. On the 8th, 11th, 12th, 13th, 16th, 19th, 20th, 22nd, 24th, 25th, 26th and 28th, the sky was clear; on all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL

*Director.*

METEOROLOGICAL OFFICE,

Toronto, April 18th, 1893.



# METEOROLOGICAL SERVICE, DOMINION OF CANADA

## Monthly Weather Review.

MARCH, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraphic reporting stations, was above the normal of nineteen years in Quebec and the Maritime Provinces, but elsewhere differed but little from normal.

The area of mean pressure of greatest departure from the normal, extended throughout British Columbia and southwards down the Pacific Coast as far as Northern California, being  $-0.10$  in. The area of mean highest pressure  $+0.05$  in. covered the whole territory, from the southern side of the St. Lawrence River to the Atlantic. Its western limit being bounded by a line from Niagara south to North Carolina.

Stations in Nova Scotia showed the highest departure from normal, being  $+0.09$  in. and Stations in Washington State and British Columbia, the lowest departure, being  $-0.14$ . The Central portion of the North American Continent was normal or very nearly so.

The movements of cyclones as a rule were fairly direct in their course. In two cases there was a tendency to dip southeastward on arrival of western depressions at the Maritime Provinces. The mean rate of movement was  $37\frac{3}{4}$  miles per hour, the highest rate  $59\frac{6}{10}$  miles and the lowest  $24\frac{3}{4}$  miles.

The approximate mean tracks of cyclones was: 1st, from Alberta to Lake Michigan, then eastward over Central Quebec and across the Gulf of St. Lawrence; 2nd, from Texas across Michigan and the Georgian Bay to the Gulf of St. Lawrence.

The principle atmospheric movements of the month were anticyclonic; which were very important and numerous.

From the 1st until the 6th, general cyclonic conditions prevailed over Eastern Canada, with westerly winds and for the most part, fair cold weather, excepting a fall of snow on the 1st in Quebec and the Maritime Provinces. There was also a moderate snowfall in Ontario on the 3rd caused by the passage of a small depression from the S.W. over the Lakes.

An important anti-cyclone spread over the North-west on the 1st accompanied by extreme night temperatures, which continued unchanged until the 6th. The conditions then became more cyclonic, and until the 9th, generally low pressure extended from the Atlantic to the Pacific with more moderate temperatures everywhere.

On the 9th an anti-cyclone moved down from the N. over the Lakes and Eastern Canada, and another anti-cyclone started next day over the North-west.

An important cyclone formed over the Western States on the 10th, moving eastward across the Lakes next day, causing a general rainfall in Ontario. It crossed Quebec on the 12th with considerably diminished energy where it also gave rain, as it did next day in the Maritime Provinces over which it passed.

By night of the 13th anti-cyclonic conditions prevailed from the Pacific to the Gulf of St. Lawrence, with fair weather and low temperature in the North-west, and temperatures near the freezing point east of Lake Huron.

A cyclone which appeared over Montana on the 11th, moved S.E. to Nebraska, then recurving it took a N.E. course, passing over Ontario on the 14th and reaching the Gulf of St. Lawrence on

the 16th. It developed on its way to the Lakes and gave a light snowfall there, then almost dispersing it moved eastward, but was joined by another cyclone which quickly developed over Virginia, causing a moderate gale and fall of snow or rain throughout Eastern Canada on the 15th.

The anti-cyclone in the North-west was very persistent and still remained there attended by decidedly cold fine weather—minimum temperatures in Manitoba averaging  $-25^{\circ}$ .

By the 16th the anti-cyclone had extended to the Lakes and Eastern Canada, bringing fine, colder weather. From then until the 19th anti-cyclonic weather covered the greater part of the continent.

During the 19th a depression from the Pacific was over Alberta, next morning it had moved to Manitoba causing light snow there and in Assiniboia. It reached the Gulf of St. Lawrence on the 21st, the anti-cyclone having passed southeastward before it, and a general rainfall and moderate S. to W. gale accompanied it.

An important anti-cyclone moved over the North-west on the 20th. It gained considerable energy and passed eastward over Ontario on the 22nd and across the Maritime Provinces, being accompanied by lower temperature and fine weather.

Generally low pressure covered the southwest States, out of which developed a cyclone on the 22nd. It travelled with increased energy to the Lakes, which it reached on the 24th, passing next day over Eastern Canada, causing strong westerly winds and rain, with higher temperature everywhere from the Lakes eastward.

In the Northwest an anticyclone gave fine cold weather on the 24th. This followed the cyclone eastward and extended over the greater part of the Continent, giving fine moderately cold weather throughout the Lake and Eastern districts until the 29th. Then a cyclone which first appeared over Alberta on the 28th, passed over the Northwest territories on the 29th, when it developed in energy. It caused a moderate to fresh westerly gale and local rains in the Lake district and on the 30th, some rain or sleet in Eastern Canada. It moved off the Nova Scotian coast on the 31st, with diminished energy, but redeveloped off the coast, causing that night high Northerly winds and a fall of snow in Nova Scotia.

A moderate rise of pressure took place over the Northwest on the 29th, but this was quickly followed by another cyclone, which passed across the Territories on the 30th, giving light local snowfalls, and was by night of the 31st, central over Lake Superior; when a strong gale was blowing from the N.W. in Manitoba with colder weather, and a moderate S.E. gale with light local rain had set in over Ontario.

#### TEMPERATURE.

The average temperature did not differ much from the normal of nineteen years except in Manitoba and the North-west Territories where it was decidedly below the normal. The greatest difference occurred at Medicine Hat (nine years normal) where the temperature was  $10^{\circ}3$  below normal.

*The Highest and Lowest Temperatures in each Province during March were:*

British Columbia,  $63^{\circ}0$  on 5th at Agassiz;  $-14^{\circ}3$  on 3rd at Fort Steele.

North-west Territories,  $54^{\circ}7$  on 28th at Glenbow;  $-39^{\circ}9$  on 3rd at Prince Albert.

Manitoba,  $43^{\circ}0$  on 29th at Oak Bank;  $-33^{\circ}3$  on 15th at Elkhorn.

Ontario,  $67^{\circ}0$  on 24th at Collingwood;  $-34^{\circ}9$  on 22nd at White River.

Quebec,  $48^{\circ}0$  on 24th at Brome;  $-20^{\circ}2$  on 19th at Chicoutimi.

Nova Scotia,  $57^{\circ}0$  on 25th at Halifax;  $-13^{\circ}2$  on 4th at Truro.

New Brunswick,  $52^{\circ}5$  on 25th at Grand Manan;  $-13^{\circ}5$  on 7th at { Chatham.  
Dalhousie.

Prince Edward Island,  $49^{\circ}0$  on 26th at Georgetown;  $-6^{\circ}3$  on 7th at Kilmahumaig.

N. W. TERRITORIES:	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				DIRECTION OF WIND FROM.						VELOCITY OF WIND.				PRECIPITATION.								
	Mean actual.		Mean reduced.		Range.	Mean.	Diff. from aver.	Years observ.	Date.	Lowest.	Mean daily range.	Mean temperature of day.	Mean relative humid.	Mean amount of cloud.	N. E. S. E. S. W. N. W. C.			Total number of hours.	Mean, miles per hour.	Velocity, days.	Date and direc.	Amount, in.	Diff. from aver.	No. of fair days.	No. of storms.	No. of fogs.	
	in.	in.	in.	in.	in.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	in.	in.	in.	in.	in.
Medicine Hat.	30.03	30.76	29.37	1.39	17.1	10.3	9.50	3	22	4	15	8	13	3	10	62	23-0	6 S N	0.23	-0.34	427	0	0	0	0	0	
Edmonton.	31.00	30.60	29.18	1.42	16.8	7.5	9.49	6	18	0	0	0	0	1	36	62	10-0	23 S E	0.22	-0.72	229	1	0	0	0	0	
Calgary.	30.12	30.68	29.45	1.23	15.1	5.8	5.46	3	14	3	5	0	6	45	62	12-0	8 E	0.22	-0.54	256	2	0	0	0	0	0	
Swift Current.	30.14	30.88	29.44	1.45	15.9	5.8	5.46	3	14	3	5	0	6	45	62	12-0	8 E	0.20	-0.54	256	2	0	0	0	0	0	
Qu'Appelle.	30.15	30.79	29.48	1.31	15.8	5.4	5.38	3	14	3	5	0	6	45	62	12-0	8 E	0.20	-0.54	256	2	0	0	0	0	0	
Indian Head.	30.15	30.79	29.48	1.31	15.8	5.4	5.38	3	14	3	5	0	6	45	62	12-0	8 E	0.20	-0.54	256	2	0	0	0	0	0	
Wadena.	30.15	30.79	29.48	1.31	15.8	5.4	5.38	3	14	3	5	0	6	45	62	12-0	8 E	0.20	-0.54	256	2	0	0	0	0	0	
Regina.	30.15	30.79	29.48	1.31	15.8	5.4	5.38	3	14	3	5	0	6	45	62	12-0	8 E	0.20	-0.54	256	2	0	0	0	0	0	
Gravel.	30.15	30.79	29.48	1.31	15.8	5.4	5.38	3	14	3	5	0	6	45	62	12-0	8 E	0.20	-0.54	256	2	0	0	0	0	0	
Calgary.	30.04	30.61	29.38	1.23	19.1	10.3	9.50	3	22	4	15	8	13	3	10	62	6 S N	0.23	-0.34	427	0	0	0	0	0	0	
Chaplin.	30.04	30.61	29.38	1.23	19.1	10.3	9.50	3	22	4	15	8	13	3	10	62	6 S N	0.23	-0.34	427	0	0	0	0	0	0	
Saskatoon.	30.04	30.61	29.38	1.23	19.1	10.3	9.50	3	22	4	15	8	13	3	10	62	6 S N	0.23	-0.34	427	0	0	0	0	0	0	
Hault.	30.04	30.61	29.38	1.23	19.1	10.3	9.50	3	22	4	15	8	13	3	10	62	6 S N	0.23	-0.34	427	0	0	0	0	0	0	
Hennetta.	30.04	30.61	29.38	1.23	19.1	10.3	9.50	3	22	4	15	8	13	3	10	62	6 S N	0.23	-0.34	427	0	0	0	0	0	0	
Glen Adelaide.	30.04	30.61	29.38	1.23	19.1	10.3	9.50	3	22	4	15	8	13	3	10	62	6 S N	0.23	-0.34	427	0	0	0	0	0	0	
Barleford.	30.04	30.61	29.38	1.23	19.1	10.3	9.50	3	22	4	15	8	13	3	10	62	6 S N	0.23	-0.34	427	0	0	0	0	0	0	
Medicine Hat.	30.04	30.61	29.38	1.23	19.1	10.3	9.50	3	22	4	15	8	13	3	10	62	6 S N	0.23	-0.34	427	0	0	0	0	0	0	
Winnipeg.	30.12	30.68	29.45	1.23	15.1	5.8	5.46	3	14	3	5	0	6	45	62	12-0	8 E	0.22	-0.54	256	2	0	0	0	0	0	
Dauphin.	30.12	30.68	29.45	1.23	15.1	5.8	5.46	3	14	3	5	0	6	45	62	12-0	8 E	0.22	-0.54	256	2	0	0	0	0	0	
Hillview.	30.12	30.68	29.45	1.23	15.1	5.8	5.46	3	14	3	5	0	6	45	62	12-0	8 E	0.22	-0.54	256	2	0	0	0	0	0	
Elkhorn.	30.12	30.68	29.45	1.23	15.1	5.8	5.46	3	14	3	5	0	6	45	62	12-0	8 E	0.22	-0.54	256	2	0	0	0	0	0	
St. Albans (Aweme).	28.74	29.42	28.16	1.26	9.6	5.2	7.42	0	8	29	5	15	27	6	47	93	0	0	0.45	-0.75	328	7	0	0	0	0	
Fort Osborne.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Oak Bank.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Ellice.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Assiniboia.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Brandon.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Osborne.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Bala.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Sarnia.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Chaplain.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Schreiber.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Carleton Place.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Little River.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Pasadena.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Palmy Sound.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Overton Sound.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Poland.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Duluth.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Essex.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-0	29 NW	0.22	-0.75	625	0	0	0	0	0
Fort Erie.	30.10	30.88	29.41	1.47	17.5	4.9	19.40	3	1	9	6	4	9	10	2	8	62	34-									

THE TYPING UNIT, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2

[illegible]



### ONTARIO—Concluded.

[illegible]

## NEWFOUNDLAND:

	PRESSURE.			TEMPERATURE				CLOUDS SKY.		WIND.	RAIN.		SNOW.		Thunder.	Aurora.	Fogs.
	Mean.	Highest.	Lowest.	Range.	Mean.	Highest.	Lowest.	Mean.	Days clear.		Amount.	Days.	Amount.	Days.			
November, 1891.	29.804	29.432	29.157	1.355	29.12	42.1	-21.6	27.94	13.39	14.64	0.79	6	3.8	3	0	1	3
December, 1891.	29.816	29.616	29.028	1.588	18.60	43.1	-34.0	27.91	7.13	29.78	0.74	6	3.8	0	1	0	1
January, 1892.	29.809	29.696	29.290	1.297	-1.26	38.0	-46.6	3.08	-17.04	29.12	0.53	4	3.1	4	0	5	1
February.	29.199	29.925	29.637	1.281	2.17	40.0	-37.5	14.48	-9.69	24.08	0.53	0	3.4	2	1	7	0
March.	29.085	29.808	29.421	1.384	16.66	53.2	-25.0	25.65	2.17	22.89	0.54	1	3.8	5	0	17	0
April.	29.017	29.563	29.060	1.505	27.71	57.7	0.0	35.47	16.83	18.64	0.63	2	4.6	0	0.38	3	1
May.	29.042	29.742	29.384	1.358	41.78	71.0	11.1	48.18	30.63	17.52	0.53	1	3.9	0	1.10	6	2
June.	29.889	29.499	29.334	1.075	59.45	80.0	31.0	65.51	45.10	29.41	0.54	0	3.4	2	0.64	9	0
July.	29.804	29.305	29.512	0.730	65.98	87.1	33.9	71.49	59.13	21.27	0.50	0	3.7	2	1.22	6	0
August.	29.945	29.304	29.540	0.755	62.13	77.0	38.9	67.67	47.89	19.78	0.57	0	2.3	5	2.01	7	0
September.	29.880	29.285	29.454	0.831	55.06	76.0	39.0	62.69	44.40	17.69	0.59	2	2.6	5	1.94	8	0
October.	29.924	29.484	29.478	0.946	40.26	69.2	24.0	45.77	33.97	11.80	0.78	0	3.4	4	1.15	10	1
Sum, or Average.	29.905	29.498	29.028	1.910	34.56	87.1	-46.6	....	....	19.14	0.60	10	3.5	32	9.89	58	62

# MOOSE FACTORY.

## Memoranda during the year :

November 18th, 1891.—River frozen over.  
 January 4th, 1892.—18 inches clear ice in river channel. Mercury frozen in thermometer on the 16th, 18th and 19th.  
 February 23rd.—Raining all night.  
 March 30th.—First snow birds seen.  
 April 5th.—First thunder storm. First duck shot on the 20th. First goose shot on the 21st. Butterflies and robins seen on the 21st.  
 May.—Frogs heard on the 14th. River opened on 17th, light snow on ground a.m. of 23rd.  
 June.—Thunder storms on 11th, 12th, 20th and 21st.  
 July.—Thunder storms on 9th, 10th, 11th, 19th, 21st and 22nd.  
 August.—Thunder storm on 7th ; lightning on 18th and 27th.  
 September.—Thunder storm on 1st ; lightning on 21st.  
 October.—Thunder storm on 2nd.

## PRECIPITATION.

The rainfall throughout the Dominion has with the exception of the centre district of Ontario and the coast of British Columbia, been considerably below the normal quantity.

*The General Distribution is as follows :—*

In British Columbia the rainfall on the coast 4'19 in. In the interior little has fallen.

In the North-west Territories it was 0'04 in. or about one-fourth of the fall in 1892.

In Manitoba rain is recorded at a number of stations to a small amount on the 10th of the month.

In Ontario, West and South-west District it was 1'19 in., or 0'58 in. below the average. In the North and North-west District it was 0'96 in., or 0'03 in. below the average. In the Central District it was 1'70 in.; or 0'29 in. above the average; and in the East and North-east District it was 0'90 in.; or 0'08 in. below the average.

In Quebec it was 0.43 in., or 0'31 in. below the average.

In New Brunswick it was 0'95 in., or 0'90 in. below the average.

In Nova Scotia it was 1'41 in., or 0'94 below the average.

In Prince Edward Island it was 1'77 in., or 0'22 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

British Columbia,—Agassiz, 6'74 in.; Quamichan, 5'05 in.; Nanaimo, 5'06 in.; Loch Erroch, 7'28 in.; Abbotsford, 5'54 in.

Bermuda, 9'52 in.

*Rainfall 1 inch and upwards in 24 hours :—*

5. Fort Simpson, 1'87 in.

6. Fort Simpson, 1'13 in.

9. Galt, 1'19 in.; Mount Forest, 1'00 in.

10. Little Forks, 1'60 in.; Bermuda, 1'04 in.

11. Elora, 1'23 in.; Presque'Isle, 1'00 in.

12. Whiteside, 1'05 in.

13. Kilmahumag, 1'12 in.; Chatham, 1'08 in.; Charlottetown, 1'14 in.

14. Port Hastings, 1'40 in.; Dorchester, 1'89 in.

18. Bermuda, 1'02.

19. Bermuda, 1'76 in.

25. Hazlemere, B.C., 1'00 in.; Glastonburg, 1'00 in.

27. Abbotsford, 1'74 in.; Esquimalt, 1'19 in.

28. Agassiz, 2'22 in.

31. Bermuda, 1'90 in.; Little Current, 1'30 in.

## SNOWFALL.

The snowfall has been exceptionally small throughout the Dominion the deficit being greatest in the central and N.E. parts of Ontario and in the Province of New Brunswick.

*The distribution is as follows :—*

BRITISH COLUMBIA.—On the coast only a small quantity has fallen, but in the interior upwards of 30 in. is recorded.

In N. W. TERRITORIES about 2 in. has fallen, or about 2 in. below that of 1892.

In MANITOBA 4'1 in. has fallen, or about 1'6 in. below the average.

In the DISTRICTS OF ONTARIO, the amount is 4'4 in., or 1'3'4 in. below the average; 9'1 in., or 12'8 in. below the average; 3'8 in., or 19'3 in. below the average; 4'4 in., or 16'5 in. below the average.

In QUEBEC 15'2 in. or 4'1 in. below the average.

In N. BRUNSWICK 4'5 in., or 16'7 in. below the average.

In NOVA SCOTIA 13'4 in., or 4'0 in. below the average.

In P. E. ISLAND 5'2 in., or 8'3 in. below the average.

*Snowfall 12 in. and upwards in the month :—*

BRITISH COLUMBIA.—Glacier, 37 in.; Barkerville, 12 in.

ONTARIO.—Novar, 12 in.; Barclay, 17 in.; Sudbury, 18 in.; Uplands, 26 in.; Cartier, 18 in.; Chappleau, 17 in.; Savanne, 12 in.; Missanabie, 20 in.; Parry Sound, 13 in.; White River, 16 in.; Bognor, 12 in.; Burks Fall, 15 in.; Thompson, 15 in.; Little current, 24 in.

QUEBEC.—Point des Monts, 35 in.; Father Point, 16 in.; Quebec, 14 in.; Richmond, 15 in.;  
\*Anticosti, 29 in.

NOVA SCOTIA.—Sable Island, 49 in.; Pictou, 13 in.

NEWFOUNDLAND.—St. Johns, 60 in.; Channel, 29 in.

*Snow fall 3 inches and upwards in 24 hours :—*

1. Anticosti, 4 in.; Pelee Island, 3 in.; Sable Island, 9 in.; Pictou, 4 in.; Whitehead, 8 in.;  
Heron Bay, 3 in.; Truro, 4 in.; White River, 3 in.

2. Cape Magdalene, 3 in.; Channel, 5 in.; Georgetown, 4 in.; Digby, 4 in.; St. John, Nfld., 12 in.

3. Presque Isle, 6 in.; Wiarton, 4 in.; Orangeville, 3 in.; Aurora, 3 in.; Thompson, 8 in.; Norwood,  
6 in.; Midland, 4 in.; Calvin, 4 in.; Channel, 10 in.; Beatrice, 3 in.; Bognor, 4 in.; Orillia, 3 in.; Burk's  
Falls, 3 in.; Perry Sound, 3 in.; Little Current, 3 in.; Durham, 4 in.

4. Goderich, 5 in.; Sable Island, 10 in.; Lakefield, 4 in.; Owen Sound, 5 in.; Uplands, 6 in.;  
Welland, 5 in.

5. Egremont, 5 in.; Bognor, 4 in.; St. Johns, Nfld., 6 in.

6. Barkerville, 3 in.; St. Johns, Nfld., 12 in.

7. Glacier, 5 in.; Donald, 3 in.; Point Escuminac, 4 in.; St. Johns, Nfld., 10 in.

8. Glacier, 3 in.; Channel, 8 in.

9. Fort Steele, 3 in.; St. Johns, Nfld., 8 in.

10. Posen, 6 in.; Wallace, 3 in.

11. Barkerville, 3 in.; Rathwell, 3 in.; Savanne, 4 in.; Barclay, 3 in.

12. Fort Steele, 3 in.

13. Anticosti, 4 in.; Chisleau, 5 in.; Sudbury, 10 in.; Swift Current, 3 in.

14. Cape Magdalene, 3 in.; Mattawa, 3 in.; Biscotasing, 5 in.; Cartier, 6 in.; Sudbury, 8 in.;

Little Current, 18 in.

15. Calvin, 3 in.; Anticosti, 3 in.; St. Hyacinthe, 6 in.; Point des Monts, 7 in.; Cartier, 4 in.;  
Quebec, 9 in.

16. Anticosti, 5 in.; Dalhousie, 4 in.; Chicoutimi, 6 in.

17. Barkerville, 4 in.

18. Thompson, 4 in.; Chilcotin, 4 in.; Sable Island, 22 in.

19. St. John's, Nfld., 12 in.

20. Oakbank, 3 in.; Rathwell, 3 in.; Savanne, 3 in.; Barclay, 4 in.; Burk's Falls, 4 in.; Little  
Forks, 6 in.

21. Point des Monts, 10 in.; Novar, 4 in.; Sault Ste. Marie, 3 in.; Richmond, 4 in.; Cartier, 3 in.;  
Axe Lake, 4 in.; Uplands, 4 in.

22. Princeton, 4 in.; Wilton Grove, 3 in.; St. Mary's, 3 in.; Port Dover, 3 in.; Port Stanley, 4 in.

23. Elkhorn, 3 in.; Savanne, 5 in.; Barclay, 3 in.; Little Current, 4 in.

24. Anticosti, 10 in.; Channel, 5 in.; Point des Monts, 7 in.; Missanabie, 16 in.; Chaplain, 5 in.;  
White River, 3 in.

25. Point des Monts, 5 in.

27. Thompson, 3 in.

28. Glacier, 3 in.; Donald, 4 in.; Sable Island, 6 in.

29. Fergus, 4 in.; Glacier, 12 in.; Axe Lake, 4 in.; Burk's Falls, 5 in.

30. Cayuga, 3 in.; Glacier, 3 in.; Point des Monts, 4 in.; Novar, 5 in.; Beatrice, 3 in.; White  
River, 3 in.

31. Kilmahumraig, 50 in.; Georgetown, P.E.I., 3 in.; Pictou, 6 in.; Truro, 3 in.

*Thunder reported on the following dates.*

2. Peterborough.

10. Thompson.

11. Bognor, Midland, Coldwater.

16. Hazlemere, B.C.

21. Stoney Creek.

22. Digby.

23. Bognor, Minden, Midland, Presque Isle, Thedford, Coldwater, Montreal.

24. Peterborough, Welland, Lakefield, Stoney Creek, Gravenhurst, Bognor, Richmond,  
Point Lepreaux, Clontarf, Barrie, Egremont, Sharon, Elora, Dorchester, N.B., Minden, St. Hyacinthe,  
Mount Forest, Scarboro, Thedford, Denbigh, Stoney Creek, Lindsay, Coldwater, Deseronto, Durham.

25. Ennismore, Truro.

31. Niagara Falls S.

*Aurora recorded—*

Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.

2. Fort Simpson.
3. Chicoutimi, IV ; Savanne.
4. St. Albans, IV ; Savanne.
6. Little Forks, IV.
7. Posen, IV ; Elkhorn, I ; Hillview, Pembina Crossing, IV ; Barrie, Buda, III ; Savanne, Richmond.
8. Fort Simpson, IV ; Port Arthur, I ; Minnedosa, IV.
10. Truro, IV ; Grand Manan, IV.
11. Chicoutimi.
12. Posen, III ; Little Forks, III.
13. Posen, I ; Saskatoon, III ; Glen Adelaide, *brigt* ; Henrietta, II ; Hillview, Pembina Crossing, IV ; Pilot Mound, *very bright* ; Barclay, II, *bright* ; Savanne, Little Forks, II ; Little Current, III.
14. Posen, II ; Saskatoon, III ; Henrietta, III ; Hillview, Rapid City, Pembina Crossing, IV ; St. Albans, IV ; Buda, IV ; Barclay, Savanne, Little Forks, II ; Edmonton, II ; Toronto, IV ;
15. Posen, II ; Gravenhurst, IV ; Birnam, IV ; Saskatoon, III ; Glen Adelaide, *bright* ; Henrietta, III ; Elkhorn, II ; Glenbow, IV ; Hillview, Pembina Crossing, IV ; Buda, IV ; Savanne, Minnedosa, II ; Little Current, IV.
16. Posen, II ; Glen Adelaide, Elkhorn, II ; Hillview, Pembina Crossing, III ; Savanne, Chicoutimi, Buda, IV ; Minnedosa, III ; Wallace, III.
17. Saskatoon, IV ; Glen Adelaide, Savanne, Prince Albert, IV ; Toronto, IV ; Wallace, III.
18. Gravenhurst, IV ; Saskatoon, IV ; Prince Albert, IV ; Wallace, III.
19. Gravenhurst, IV.
20. Elkhorn, I.
21. Pembina Crossing, IV ; Little Current, IV.
22. Bancroft, III.
23. Pembina Crossing, IV.
24. Saskatoon, III ; Hillview, Rapid City, Pembina Crossing, III ; St. Albans, II ; Savanne.
25. Hillview, Pembina Crossing, IV ; Savanne, Battleford, IV.
28. Mattawa, Lucknow, Alexandria, II.
30. Battleford, I.

*Appearance of Spring Birds, &c.:—*

CROWS.—Cayuga, 3rd ; Midland, 9th ; Thedford, 2nd ; Wyoming, 1st ; Posen, 30th ; Minden, 6th ; Roseberry, 30th ; Pembina Crossing, 27th ; Treherne, 20th ; Galt, 5th ; Alton, 7 ; Shannonville, 6th ; Fort Francis, 25th ; Burk's Falls, 10th ; Peterboro', 1st ; Orillia, 6th ; St. Mary's, 7th ; Collingwood, 19th ; Haliburton, 6th ; Birnam, 1st ; Bognor, 6th ; Clontarf, 6th ; Point Clark, 4th ; Conestogo, 5th ; Beatrice, 7th ; Bancroft, 8th ; Spence's Bridge, 10th ; Wallace, 31st.

ROBINS.—Princeton, 12th ; Presque Isle, 24th ; Warton, 24th ; Bloomingdale, 26th ; Cayuga, 13th ; Dealtown, 28th ; Collingwood, 25th ; Stoney Creek, 7th ; Gravenhurst, 26th ; Birnam, 6th ; St. Thomas, 6th ; Midland, 24th ; Georgetown, 18th ; Thedford, 17th ; Wyoming, 13th ; Scarboro', 25th ; Cowal, 12th ; Minden, 20th ; Bognor, 26th ; Point Clark, 9th ; Barrie, 27th ; Egremont, 24th ; Beatrice, 7th ; De Cewsville, 17th ; Pembina Crossing, 30th ; Galt, 8th ; Alton, 24th ; Elora, 9th ; Sharon, 11th ; Shannonville, 18th ; Cottam, 8th ; Bancroft, 30th ; Lindsay, 24th ; Spence's Bridge, 16th ; Norwood, 25th ; Peterboro', 22nd ; Ridgetown, 8th ; Lucknow, 24th ; Orillia, 25th ; St. Mary's, 15th ; Welland, 17th.

BLUE BIRDS.—Cayuga, 10th ; Georgetown, 20th ; Thedford, 12th ; Scarboro', 24th ; Cowal, 11th ; Galt, 24th ; Elora, 21st ; Cottam, 2nd ; Lucknow, 24th ; Stoney Creek, 11th ; St. Thomas, 9th ; Egremont, 24th ; De Cewsville, 11th ; Spence's Bridge, 9th.

BLACK BIRDS.—Princeton, 13th ; Presque Isle, 31st ; Bloomingdale, 24th ; Cayuga, 25th ; Georgetown, 29th ; Thedford, 18th ; Wyoming, 13th ; Cowal, 24th ; Minden, 22nd ; Ridgetown, 14th ; Lucknow, 23th ; St. Mary's, 24th ; Welland, 24th ; Stoney Creek, 11th ; Birnam, 10th ; Egremont, 24th ; De Cewsville, 13th.

MEADOW LARKS. Presque'Isle, 31st; Treherne, 7th; Cottam, 20th; Stoney Creek, 18; Barrie, 31st; De Cewsville, 28th.

GESE. -Ennismore, 28th; Cowal, 22nd; Pelee Island, 12th; Roseberry, 31st; Pembina Crossing, 30th; Shannonville, 15th; Welland, 30th; Stoney Creek, 17th; Truro, 27th; Wallace, 31st.

GREY BIRDS. -Cayuga, 22nd; Sharon, 24th; Welland, 19th.

HAWKS. Cowal, 25th.

SONG SPARROWS. -Cowal, 27th; De Cewsville, 29th.

FROGS TILING. Cottam, 20th; Lucknow, 31st; Welland, 21st; Port Rowan, 24th; Stoney Creek, 31st; Birnam, 27th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF MARCH, 1883.

#### HOURS ENDING

	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	12 NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....			8	0 12	0 23	0 25	0 33	0 39	0 32	0 33	0 32	0 37	0 24	8		
AGASSIZ, B.C. ....				01	19	37	43	41	45	46	34	17	00			
BRANDON.....			0 02	22	47	62	65	64	67	63	70	69	54	0 23		
INDIAN HEAD.....				06	27	52	53	61	58	55	50	45	13	00		
WINNIPEG.....			22	47	61	69	73	74	77	70	74	67	58	10		
WOODSTOCK.....				09	29	49	48	54	52	54	49	45	35	18	00	
TORONTO.....				12	32	42	51	51	51	65	62	52	41	37	11	
LINDSAY.....				17	39	41	47	45	59	61	62	62	52	42	37	08
BARRIE.....				05	29	36	45	42	57	59	45	35	26	11		
KINGSTON.....				22	36	43	50	52	73	54	56	61	56	38	15	
MONTREAL.....				02	31	49	54	56	59	55	49	44	34	18	00	
FREDERICTON.....				12	41	49	61	62	69	62	59	58	55	48	21	
SYDNEY.....																

	ESQUIMAULT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.	SYDNEY.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0 23	0 23	0 52	0 35	0 59	0 55	0 42	0 46	0 36	0 45	0 41	0 50	..
MAXIMUM DAILY AMOUNT .....	0 81	0 68	0 89	0 86	0 90	0 82	0 49	1 00	0 84	0 93	0 96	0 91	..
DATE .....	5	2	29	3	3	2	16	28	27	2	25	5	..
NO. OF DAYS COMPLETELY CLOUDED.....	10	10	4	8	4	9	6	6	10	6	8	4	..

#### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 588. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	95	69	9	17	77 4
LOWER LAKE REGION .....	109	70	26	13	76 1
UPPER ST. LAWRENCE .....	99	65	17	17	74 2
LOWER ST. LAWRENCE .....	95	68	14	13	78 9
GULF.....	93	68	15	10	81 2
MARITIME PROVINCES .....	97	67	15	15	76 8
TOTAL .....	588	497	96	85	77 4

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer H. V. Payne.

#### STORM WARNINGS.

During the month warnings on the approach of two storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 30 of which 9 or 30 per cent. were verified.

In connection with the warnings, predictions as to the probable directions of the wind were given; and the 9 warnings verified as to force, were fully verified, as to direction.

No. 1. At 11 a.m. on the 4th, Gulf and Ocean stations were warned for a heavy easterly gale in advance of an important disturbance travelling up the Atlantic. The disturbance, however, afterwards passed far to the eastward and its accompanying gales were only felt as far west as Halifax. Sydney reports a strong gale during the night of the 4th. Signals were lowered at 3.30 p.m. on the 5th.

No. 2. Gulf and ocean stations were warned for a moderate easterly gale at 11.15 a.m. on the 9th, as it was anticipated that an area of low pressure covering the Middle and Atlantic states would move up the coast with increasing energy. Subsequently, however, it passed far to the southward of the Maritime Provinces, and except at Halifax where a moderate gale was recorded, no storm apparently occurred. Signals were lowered at 10.50 a.m. on the 10th.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR MARCH, 1893.

On the morning of the 1st slight irregularities were shown lasting for a brief period. A normal curve then followed until a little before 8 p.m. of the 2nd, when the declination magnet took up a bold easterly swing. At 8.03 p.m. a gradual westerly curve set in. At 10 p.m. the magnet was steady. On the 3rd and 4th and early hours of the 5th, a slight disturbance was going on. At 11.22 p.m. of the 5th, the declination needle moved slowly east, followed by a westerly recovery of 23', the magnet was very steady previous to this irregularity and continued so up to the 7th, when some minor changes appeared. On the 10th, previous to the 8 p.m. observation, a small easterly deflection was noticed. The 12th was a very steady day. The magnets were very restless on the 14th and 15th. Slow waves of disturbance were recorded during the afternoon of the 14th, and between 11.20 p.m. and 0.30 a.m. of the 15th the movements increased, previous to midnight the declination needle was on a westerly swing of 30' attended by a slight increase of the horizontal force. During the morning of the 15th the declination magnet was moving in short vibrations, but during the evening the movements were more prolonged. The v. f. after 6 p.m. of the 14th commenced to increase, and after 8 p.m. gradually decreased until after midnight, and was below its normal value on the morning of the 15th.

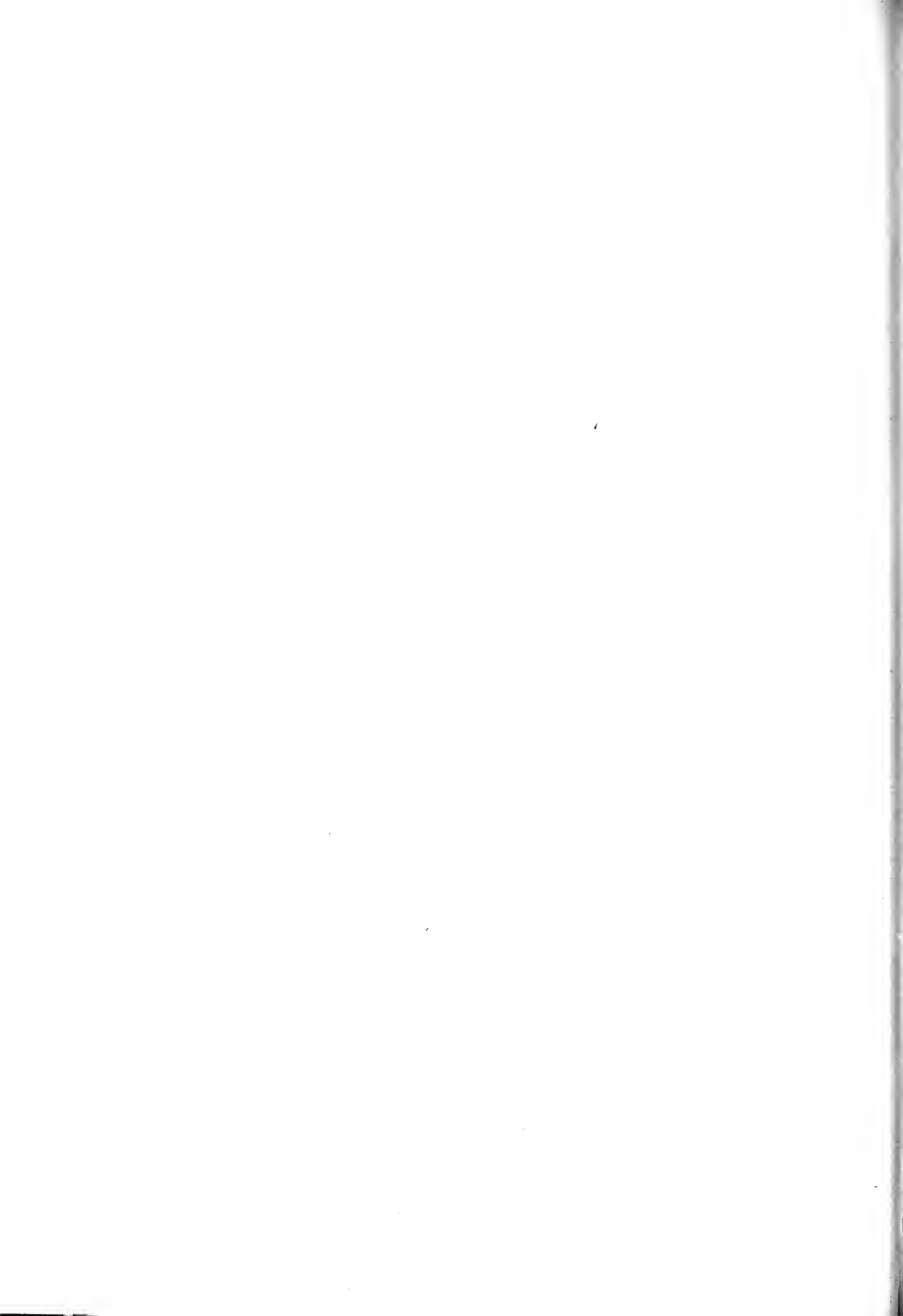
Slight disturbing action was visible on the 16th and 17th, followed by a very quiet period, lasting until the 24th, the daily movement of the declination needle being well marked on those days. A very sudden little hitch was noticed about 11.15 p.m. of the 24th, being more prominent on the bifilar curve, the instrument showing an increase of force. After 1 a.m. of the 25th the declination magnet moved east 27'. The curve then became irregular and at 8 a.m. what looked like the initial movement to a large storm appeared but nothing of much importance followed. At 8.03 the declination was on a rapid westerly movement, followed immediately by a larger easterly one, the force magnets at first showing an increase followed by a decrease. Between 8 and 10 a.m. the magnets deviated but little from their normal position but were decidedly disturbed, after 10 a.m. the disturbance passed off. On the morning of the 26th a slight disturbance set in, and between 6 and 10 a.m. the movements increased, the declination curve showing several sharp swings between 3 and 4 p.m. A marked increase of the vertical component set in at 10 a.m. of the 26th, and became more rapid during the afternoon, a recovery began at 4 p.m. and at 9 p.m. the magnet was steady and the reading about normal. The horizontal component was increased between 2 and 4 p.m., a marked maximum taking place at 3.27 p.m. The morning of the 27th was slightly disturbed, the afternoon quiet, but after 6 p.m. the declination needle moved east, and by 8 p.m. was again steady. Slight disturbances were felt on the 28 and 29th, the last two days of the month were comparatively free from disturbances with the exception of a little irregularity shortly after 8 p.m. of the 31st.

On the 14th suspicion of aurora in N. and N.E. Faint auroral light in N.E. on the 17th. On the 1st, 5th, 6th, 7th, 9th, 16th, 18th, 26th, 27th and 28th the sky was clear but no aurora was observed, on all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARMAEL.

*Director.*

METEOROLOGICAL OFFICE,  
Toronto, May 10th, 1893.





## METEOROLOGICAL SERVICE, DOMINION OF CANADA

# Monthly Weather Review.

APRIL, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraphic reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The average pressure, as determined from the observations taken at telegraphic reporting stations, were slightly below the normal of nineteen years from Minnedosa to Toronto. East and West of these stations the pressure was above the normal.

The area of mean atmospheric pressure of greatest departure below normal—0.05, lay over the country from the extreme South-west States north-eastward in Lake Superior, while the area of mean highest pressure—0.10 above normal, embraced New Brunswick, Nova Scotia and the Atlantic coast, south to latitude 30°. The greater portion of the continent showed the temperature much below its average, and in our North-west Territories the departure below normal was as much as 10°. Areas of depression travelled in an approximate mean track from the Middle Pacific States over the Upper Lakes, and thence northward of the St. Lawrence Valley, the average rate of movement was 31.5 miles per hour, being a little in excess of the normal. The high pressure areas were numerous, and, as a rule, important, and nearly all moved from the northward of Manitoba. A deep disturbance which passed quickly into the Maritime Provinces from the Atlantic, on the 18th, caused there the most severe storm of the month that occurred in any portion of Canada.

April opened with moderately deep depressions, covering the Ottawa Valley and our Rocky Mountain Slope, accompanied by unsettled weather and rain or snow showers, and comparatively high pressure over and to the northward of Manitoba, where it was fine and decidedly cold, with the temperature near to or below zero.

The Ottawa Valley depression gave showers over Eastern Canada on the 1st, which were at once followed by clearing cold north-westerly winds owing to the advance and development of the Manitoba high pressure area.

The rain and snow showers attending the Rocky Mountain depression soon spread to Manitoba, and continued up to the night of the 3rd. On the 3rd it also gave showers in Ontario, and on the 4th, whilst the depression was passing quickly down the St. Lawrence, rain fell heavily in portions of Eastern Canada, more especially along the Nova Scotian coast.

The pressure was comparatively high in the North-west, and as far as the Lake Region on the 4th, at the same time the weather in the former districts remained very unsettled and cold with local snowfalls. By the morning of the 5th, an important anticyclone covered Manitoba and the North-west, attended by decidedly cold weather. Prince Albert reported  $-20^{\circ}$ ; Battleford,  $-6^{\circ}$ ; and Qu'Appelle,  $0^{\circ}$ . The important anticyclone then passed over Canada to our Atlantic coast, drawing cold northerly to north-westerly winds over all localities, and, on the 5th, light snowfalls occurred locally in Ontario.

Between the 5th and 6th, the pressure gave way rapidly over the Pacific States and the Western and South-western portions of the continent, and an important disturbance was soon formed. Rain and snow at once began to fall over the North-west Territories and Manitoba, and very quickly spread throughout the country to the Atlantic, accompanied at first by strong winds and gales from the eastward. The disturbance, after reaching the Lake Region on the 7th, passed more quickly to the Atlantic, and by the morning of the 9th had disappeared off our coasts. It was immediately

succeeded by a well marked anticyclone, which, as it spread over Canada, gave a short spell of fine, although as a rule cool weather, lasting from the 9th until the 11th and 12th in the Lake Region and the Maritime Provinces respectively.

On the night of the 11th, rain and snow, chiefly the latter, fell heavily in Manitoba and portions of the Territories, attended by a north-easterly to northerly gale, owing to the advance north-eastward of a severe storm, which had developed in the Western States. This storm caused on the 12th rain, as well as an easterly gale in Ontario, and on the 13th as it traversed the St. Lawrence Valley with diminishing energy it gave showers generally over Eastern Canada.

High pressure and fine decidedly cold weather prevailed in our North-west between the 12th and 14th, and minima near to or below zero were recorded in many localities. From the Lakes to the Atlantic, however, the movement of another disturbance from the South-west States, and a little to the southward of Canada, caused the weather to continue unsettled, and eventually in Ontario early on the 15th, and later in the day in Quebec and the Maritime Provinces, snow fell heavily in nearly all localities.

The 16th and 17th were, as a rule, fair days, although the presence of slight minor depressions gave some scattered showers of rain or sleet.

On the 18th, a severe storm moved with great rapidity into the Maritime Provinces from the Atlantic, and caused there a heavy north-easterly to north-westerly gale, accompanied by rain and snow, chiefly the latter.

On the 20th, owing to the influence of an important disturbance passing up the Mississippi Valley, a fresh easterly gale was experienced over Ontario, attended by heavy rains. Strong winds and gales and rain also occurred on the 21st in Quebec and the Maritime Provinces, and afterwards, as the disturbance travelled slowly to the Lake Region and thence down the St. Lawrence Valley, the weather was unsettled and showery in Ontario, until the night of the 22nd, and until the following night in Eastern Canada.

The last week of the month was characterized by much the same type of high and low pressure areas that had obtained during the preceding weeks. An important anticyclone, which was shown to the northward of Manitoba on the 24th, passed between the 25th and two following days over Canada to the Atlantic, drawing at first strong and cold northerly winds in all localities, with minima of  $18^{\circ}$  in Manitoba and as low as  $14^{\circ}$  in portions of Ontario and Quebec. It was succeeded by a deep disturbance from the South-west States, which on the 26th caused an easterly gale and rain over the Lake Region. This disturbance, like most of its predecessors from the southwestward, decreased in energy after reaching Lake Superior, and eventually moved down the St. Lawrence as a minor depression, giving numerous showers between the 27th and 28th in Eastern Canada.

Another anticyclone of importance, which at first was shown in the North-west Territories on the 26th, spread over the country in rear of the disturbance, and during its presence, until the end of the month, the weather from the Lakes to the Atlantic was fair and cool, except that in Ontario towards the evening of the 30th, owing to the approach of still another south-west depression, rain set in attended by strong winds and moderate gales from the eastward.

[ The general weather conditions in the North-west Territories and Manitoba after the 17th, were, light snowfalls on the 16th and 20th, a moderate snowfall at many places between the 23rd and 24th, and light snow or sleet showers between the 25th and 28th; at other times it was fine.

#### TEMPERATURE.

The average temperature has been below the normal throughout the Dominion. This was especially the case in the northwestern part of Ontario, Manitoba and the North-west Territories, where the defect was from  $7^{\circ}$  to  $14^{\circ}$ .

*The Highest and Lowest Temperatures in each Province during April were:*

British Columbia,  $70^{\circ}$  on 30th at Griffin's Lake;  $41^{\circ}$  on 10th at Barkerville.

North-west Territories,  $68^{\circ}2$  on 22nd at Glenbow;  $19^{\circ}3$  on 5th at Prince Albert.

Manitoba,  $61^{\circ}3$  on 26th at St. Albans;  $15^{\circ}$  on 1st at Channel Island.

Ontario,  $76^{\circ}$  on 7th at Point Pelee;  $24^{\circ}$  on 6th at Buda.

Quebec,  $66^{\circ}8$  on 8th and 13th at Montreal;  $40^{\circ}$  on 3rd at Chicoutimi.

New Brunswick,  $57^{\circ}2$  on 30th at St. Andrews;  $-5^{\circ}$  on 7th at Dalhousie.

Nova Scotia,  $50^{\circ}$  on 13th at Truro;  $10^{\circ}7$  on 3rd at Truro.

Prince Edward Island,  $55^{\circ}$  on 29th at Georgetown;  $8^{\circ}5$  on 3rd Kilmahumraig.







## PRECIPITATION.

In Ontario and British Columbia (compared as a whole) the rainfall has considerably exceeded the average in the other Provinces of the Dominion the amount has either closely approximated to the average or fallen considerably short, the greatest defect occurring in New Brunswick and Prince Edward Island.

*The General Distribution is as follows :—*

In British Columbia the rainfall on the coast 4·17 in. or nearly double that of 1892. In the interior little has fallen.

In the North-west Territories rain has fallen only at a few stations to a trifling amount.

In Manitoba rain is recorded at nearly all stations, and at some to a considerable amount, the average amount being 0·35 in.; last year only a few drops fell about the 21st.

In Ontario, West and South-west District it was 3·37 in., or 1·41 in. above the average. In the North and North-west District it was 1·91 in., or 0·24 in. above the average. In the Central District it was 2·96 in.; or 1·06 in. above the average; and in the East and North-east District it was 2·20 in.; or 0·54 in. above the average.

In Quebec it was 1·11 in., or 0·20 in. below the average.

In New Brunswick it was 1·08 in., or 0·85 in. below the average.

In Nova Scotia it was 2·40 in., or 0·01 below the average.

In Prince Edward Island it was 0·73 in., or 1·05 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA. Esquimalt, 5·40 in.; Agassiz, 5·91 in.; Abbotsford, 5·58 in.; Loch Erroch, 7·33 in.; Hazelmere, 6·03 in.

NEWFOUNDLAND.—St. John's, 7·88.

*Rainfall 1 inch and upwards in 24 hours :—*

1. Esquimalt 1·08 in.; St. John, Nfld., 1·40 in.
5. Whitehead, 1·60 in.
7. Georgetown, 1·08 in.; Point Clark, 1·18 in.; Port Dover, 1·11 in.; Toronto, 1·22 in.; Little Current, 1·10.
8. Chicoutimi, 1·12 in.
10. Hazelmere, B.C., 1·05 in.
12. Thompson, 1·32 in.; Lions Head, 1·02 in.; Sunshine, 1·20 in.; Port Arthur, 1·35 in.
19. St. John's, Nfld., 1·54.
20. Hazelmere, B.C., 1·27 in.; Loch Erroch, B.C., 1·08 in.; Bancroft, 1·25 in.; Scarboro', 1·73 in.; Eamissnore, 1·10 in.; Cayuga, 1·30 in.; Georgetown, 1·21 in.; Aurora, 1·34 in.; Bloomingdale, 1·03 in.; Thedford, 1·05 in.; Peterborough, 2·27 in.; Galt, 1·20 in.; DeCewsville, 1·48 in.; Minden 1·17 in.; London, 1·15 in.; Esquimalt, 1·25 in.; Woodstock, 1·04 in.; Port Dover, 1·12 in.; Port Stanley, 1·03 in.; Toronto, 1·82 in.; Little Current, 1·10 in.
21. Oliver's Ferry, 1·37 in.; Deer Park, 1·90 in.; Fergus, 1·10 in.; Lakefield, 1·08 in.; St. George, 1·27 in.; Norwood, 1·90 in.
22. Princeton, 1·32 in.
23. Point de Monts, 1·60 in.
27. Sault Ste. Marie, 1·10 in.; St. John's, Nfld., 2·50 in.; Little Current, 1·20 in.

## SNOWFALL.

The snowfall has exceeded the average, except in the Province of Nova Scotia.

*The distribution is as follows :—*

BRITISH COLUMBIA. On the whole about 5 in. has fallen.

In NORTH WEST TERRITORIES about 4·7 in. has fallen, or about half of 1892.

In MANITOBA 8·8 in. has fallen, or about 2 in. below the average.

In the districts of ONTARIO the amount is 4·8 in., or 3·6 in. above the average; 8·3 in., 5·9 in. above the average; 8·3 in., or 6·6 in. above the average; 6·8 in., or 4·0 in. above the average.

In QUEBEC 1·40 in., or 1·3 in. above the average.

In NEW BRUNSWICK 1·20 in., or 5·0 in. above the average.

In NOVA SCOTIA 3·9 in., or 3·7 in. below the average.

In PRINCE EDWARD ISLAND 10·7 in., or 0·1 in. above the average.

*Snowfall eight inches and upwards during month :—*

BRITISH COLUMBIA.—Barkerville, 17 in. ; Glacier, 20 in.

NORTH-WEST TERRITORIES.—Qu'Appelle, 10 in. ; Oonikup, 8 in. ; Glen Adelaide, 11 in. ; Glenbow, 13 in.

MANITOBA.—Treherne, 9 in. ; Rathwell, 14 in. ; Oak Bank, 20 in. ; Pilot Mound, 9 in. ; Gretna, 16 in. ; Norquay, 15 in. ; Hillview, 12 in. ; Clarkleigh, 13 in. ; Hartney, 10 in. ; Greenwood, 17 in. ; Winnipeg, 15 in. ; Emerson, 13 in.

ONTARIO.—Egremont, 13 in. ; Novar, 9 in. ; Cottam, 8 in. ; Norwood, 11 in. ; Peterborough, 11 in. ; Orillia, 10 in. ; De Cewsville, 8 in. ; Beatrice, 18 in. ; Gravenhurst, 8 in. ; Barrie, 10 in. ; Schreiber, 17 in. ; Sudbury, 8 in. ; Axe Lake, 11 in. ; Sault St. Marie, 8 in. ; Haliburton, 8 in. ; Bancroft, 11 in. ; Thompson, 8 in. ; Cartier, 16 in. ; Chapleau, 8 in. ; Savanne, 16 in. ; Barclay, 55 in. ; Buda, 36 in. ; Missanabie, 8 in. ; Orangeville, 21 in. ; Aurora, 9 in. ; White River, 11 in. ; Port Arthur, 11 in. ; Uplands, 12 in. ; Sprucedale, 8 in.

QUEBEC.—Father Point, 25 in. ; Bicquet, 10 in. ; Cape Magdalen, 20 in. ; Esquimaux Point, 10 in. ; Brome, 9 in. ; Chicoutimi, 10 in. ; Richmond, 9 in. ; Anticosti, W. P., 42 in. ; St. Hyacinthe, 10. ; Montreal, 8 in.

NEW BRUNSWICK. —Dalhousie, 14 in. ; Point Lepreaux, 13 in. ; Grand Mannan, 8 in. ; Chatham, 21 in. ; Parker's Ridge, 11 in. ; Point Escuminac, 14 in. ; Bathurst, 11 in.

NOVA SCOTIA.—Yarmouth, 12 in.

PRINCE EDWARD ISLAND.—Charlottetown, 11 in. ; Kilmahumaig 11 in. ; Georgetown, 15 in.

*Snowfall 3 inches and upwards in 24 hours :*

1. Hillview, 4 in. ; Brandon, 3 in. ; Anticosti, W.P., 3 in. ; Loch Erroch, B.C., 5 in. ; Qu'Appelle, 3 in.

2. Oak Bank, 3 in. ; Clarkleigh, 3 in. ; Schrieber, 6 in. ; Barclay, 5 in. ; Winnipeg, 3 in.

3. Richmond, 3 in.

4. Dalhousie, 4 in. ; Anticosti, W.P., 7 in. ; Henrietta, 6 in. ; Father Point, 4 in.

5. Barclay, 3 in. ; Buda, 4 in.

6. Glenbow, 8 in. ; Axe Lake, 3 in.

7. Emerson, 6 in. ; Rathwell, 4 in. ; Morden, 3 in. ; Pilot Mound, 3 in. ; Dalhousie, 3 in. ; White-side, 3 in. ; Denbigh, 3 in. ; Savanne, 3 in. ; Lindsay, 3 in. ; Parry Sound, 3 in.

8. Elkhorn, 3 in. ; Point Lepreaux, 3 in. ; Point Escuminac, 5 in. ; Anticosti, W.P., 11 in. ; Barclay, 4 in. ; Fredericton, 3 in. ; Chatham, 3 in.

9. Channel, 9 in. ; Anticosti, W.P., 3 in. ; Father Point, 6 in.

11. Brandon, 3 in. ; Rathwell, 3 in. ; Barkerville, 6 in.

12. Posen, 4 in. ; Oak Bank, 5 in. ; Treherne, 8 in. ; Pilot Mound, 4 in. ; Gretna, 4 in. ; Clarkleigh, 4 in. ; Fort Francis, 9 in. ; Savanne, 6 in. ; Barclay, 3 in. ; Barkerville, 3 in. ; Winnipeg, 5 in.

13. Greenwood, 4 in. ; Barclay, 24 in. ; Glacier, B.C., 3 in.

14. Cape Magdalene, 3 in. ; St. George, 4 in. ; Galt, 5 in. ; Lakefield, 3 in. ; Cowal, 6 in. ; Glacier, B.C., 6 in.

15. Stoney Creek, 5 in. ; Brome, 7 in. ; Greenwood, 3 in. ; St. Hyacinthe, 8 in. ; Egremont, 4 in. ; Chatham, 6 in. ; Paris, 5 in. ; Norwood, 7 in. ; Wanstead, 4 in. ; Point Clark, 6 in. ; De Cewsville, 5 in. ; Niagara Falls S. 4 in. ; Clontarf, 4 in. ; Bognor, 3 in. ; St. Mary's 5 in. ; Shannonville, 4 in. ; Richmond, 6 in. ; Coldstream, 6 in. ; Bloomingdale, 4 in. ; Mount Forest, 4 in. ; Orangeville, 8 in. ; Bancroft, 4 in. ; Ridgetown, 7 in. ; Lucknow, 3 in. ; Port Rowan, 6 in. ; Birnam, 4 in. ; Thedford, 3 in. ; Georgetown, 6 in. ; Cayuga, 6 in. ; Blenheim, 6 in. ; Scarborough, 5 in. ; Princeton, 5 in. ; Deer Park, 5 in. ; Denbigh, 4 in. ; Wyoming, 3 in. ; Sarnia, 4 in. ; Dealtown, 4 in. ; Ottawa, 5 in. ; Glacier, 3 in. ; London, 5 in. ; Deseronto, 6 in. ; Lindsay, 6 in. ; Fredericton, 9 in. ; Port Dover, 5 in. ; Wilton Grove, 6 in. ; St. Thomas, 6 in. ; Olivers Ferry, 4 in. ; Port Stanley, 6 in. ; Kingston, 4 in. ; Toronto, 6 in. ; Montreal, 5 in.

16. Point Lepreaux, 4 in. ; Georgetown, P.E.I., 5 in. ; Kilmahumaig, 6 in. ; Aurora, 7 in. ; Glacier, B.C., 4 in. ; Charlottetown, 4 in. ; Chatham, 5 in.

17. Point Escuminac, 4 in. ; Glen Adelaide, 5 in. ; Qu'Appelle, 4 in.

18. Digby, 3 in. ; Point Escuminac, 5 in. ; Georgetown, 3 in. ; Anticosti, W.P., 11 in. ; Barkerville, 4 in. ; Truro, 3 in. ; Fredericton, 3 in. ; Charlottetown, 4 in. ; Grand Manan, 4 in. ; Yarmouth, 7 in. ; St. Andrews, 4 in. ; Halifax, 3 in. ; Chatham, 6 in.

19. Posen, 4 in. ; Oak Bank, 5 in. ; Clarkleigh, 4 in. ; Point Lepreaux, 4 in. ; Kilmahumaig, 4 in. ; Cape Magdalene 12 in.

20. Greenwood, 8 in.; Egremont, 3 in.; Minden, 4 in.; Thompson, 8 in.; Novar, 4 in.; Sault St. Marie, 3 in.; Cartier, 12 in.; Sudbury, 8 in.; Chapleau, 3 in.; Winnipeg, 3 in.

21. Beatrice, 11 in.; Foxton, 3 in.; Uplands, 6 in.; Axe Lake, 6 in.; Bancroft, 6 in.; Calvin, 4 in.; Burk's Falls, 4 in.; Orangeville, 11 in.; Buda, 3 in.; Nepigon, 3 in.; Rockliffe, 5 in.; Little Current, 3 in.

22. Mattawa, 4 in.; Chicoutimi, 10 in.; Schreiber, 3 in.

23. Medicine Hat, 4 in.

24. Fort Francis, 5 in.

25. Biquit, 3 in.; Father Point, 6 in.; Bathurst, 6 in.

26. Georgetown, P.E.I., 4 in.; Glen Adelaide, 3 in.; Savanne, 3 in.; Barclay, 4 in.; Buda, 12 in.

27. Schreiber, 3 in.; Barclay, 6 in.; Buda, 8 in.

*Aurora recorded—*

*When the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

2. St. Albans, IV; Hillview, Emerson, Elkhorn, I; Saskatoon, IV.

3. Elora, Minnedosa, III.

5. Hillview, Cayuga, III; Minnedosa, IV.

7. Minnedosa, III.

10. Posen, III; Elkhorn, I; Saskatoon, IV; Henrietta, III; Minnedosa, II; Father Point, IV; Prince Albert, IV.

11. Georgetown, P.E.I., Elora, Bancroft, III; Chicoutimi, IV; Saskatoon, III; Henrietta, I; Truro, III; Fredericton, III; Father Point, IV; Prince Albert, I; Clontarf, IV.

12. Elkhorn, I; Pembina Crossing, IV; Saskatoon, II; Truro, III; Fredericton, IV; Father Point, IV.

13. Posen, I; Hillview, Channel, Island, IV; Elkhorn, I; Pembina Crossing, IV; Egremont, III; Saskatoon, IV; Henrietta, III; Buda, III; Minnedosa, II; Prince Albert, IV; Little Current, IV.

14. Posen, II; Channel Island, IV; Pembina Crossing, IV; Saskatoon, IV; Buda, IV; Minnedosa, II; Battleford, IV; Father Point, IV; Medicine Hat, IV; Quebec, IV; Port Arthur, II.

15. Posen, III; Elkhorn, II; Gravenhurst, IV; Barrie, Lucknow, Birnam, Buda, III; Medicine Hat, IV.

16. Posen, II; Saskatoon, IV; Fredericton, IV; Father Point, IV; Prince Albert, III.

17. Elora.

18. St. Albans, III; Hillview, Elkhorn, I; Gravenhurst, IV; Saskatoon.

19. Gravenhurst, IV; Uplands, Peterborough, II; Sprucedale, Novar, III; Bancroft, III; Burk's Falls, II; Midland, II; Georgetown, IV; Buda, IV; Ottawa, IV; Father Point, III; Quebec, IV.

20. Prince Albert, IV.

21. Channel Island, IV.

25. Peterborough, III.

26. Father Point, III.

*Thunder or lightning recorded on:—*

2. Point Clark.

3. Buda, Ennismore, Presque'Isle, Midland, Burk's Falls, Birnam, Owen Sound, Whiteside, Barrie, Thompson, Bognor, Orillia, Norwood, Egremont.

4. Wiarton, Lion's Head, Scarboro', Huntsville, Sunshine, Presque'Isle, Georgetown, Birnam, Bancroft, Novar, Axe Lake, Shannonville, St. Mary's, Sprucedale, Clontarf, Niagara Falls, Peterboro', Uplands, Elora, Egremont, Gravenhurst, Lindsay, Toronto.

5. Digby.

6. St. Thomas, Blenheim, Birnam, Thompson.

7. Buda, Savanne, St. Thomas, Wilton Grove, Dealtown, Wiarton, Wyoming, Ennismore, Cayuga, Midland, Burk's Falls, Aurora, Calvin, Bloomingdale, Coldstream, Thedford, Birnam, Owen Sound, Ridgetown, Bancroft, Shannonville, St. Mary's, Elora, Renfrew, Galt, Orillia, DeCewsville, Minden, Point Clark, Wainstead, Chatham, Ont., Sprucedale, Bognor, Cottam, Pelee Island, Niagara Falls, Lakefield, Peterboro', Egremont, Gravenhurst, Parker's Ridge, St. Hyacinthe, Fort Francis, Beatrice, Cartier, Ottawa, Deseronto, Montreal (*heary*).

8. Wilton Grove, Wyoming, Huntsville, Georgetown, Calvin, Thedford, Haliburton, Ridgetown, Bancroft, Conestogo, Richmond, Novar, Barrie, Axe Lake, St. Mary's, Sprucedale, Cottam,



Clontarf, Renfrew, Galt, DeCewsville, Paris, Norwood, Midland, Chatham, Ont., Egremont, Cape Chatte, Dalhousie, St. Hyacinthe, Beatrice, Stony Creek, Point Escuminac, Deseronto, Lindsay, Fredericton, Toronto, Bathurst.

9. Lion's Head, Haliburton Pelee Island, Whitehead, Kilmahumaig, Turo.

11. Savanne, Bloomingdale.

12. Paris, Point Clark, Wanstead, Midland, Egremont, Stony Creek, Toronto, Warton, Lion's Head, Cayuga, Presque Isle, Burk's Falls, Thedford, Birnam, Owen Sound, Conestogo, Barrie, Thompson, St. Mary's, Bognor, Cottam, Uplands.

13. Huntsville, Birnam, Conestogo, Novar, St. Marys, Bognor, Gravenhurst.

15. Lucknow.

16. Wanstead.

17. Chaplin.

20. Scarboro', Cayuga, De Cewsville, Stony Creek.

21. Shannonville, Deseronto.

27. Cottam.

*Appearance of Spring Birds, &c. :—*

SWALLOWS.—Bancroft, 30th; Ridgetown, 21st; Port Rowan, 3rd; De Cewsville, 14th; Peterboro', 17th; Elkhorn, 5th.

MEADOW LARKS.—Pembina Crossing, 1st; Shoal Lake, 8th; Wallace, N.W.T., 8th.

GREY BIRDS.—Thedford, 9th.

YELLOW BIRDS.—Gravenhurst, 11th.

SONG SPARROWS.—Thedford, 10th.

HUMMING BIRDS.—French Creek, Vancouver Island, 16th.

KINGBIRD.—Thedford, 16th; Port Rowan, 3rd; De Cewsville, 2nd.

WHIP-POOR-WILL.—Gravenhurst, 19th.

WILD GEESE.—Thedford, 23rd; Midland, 5th; Denbigh, 14th; Kilmahumaig, 5th; Fort Francis, 17th; Barrie, 2nd; Beatrice, 14th; Elkhorn, 4th; Channel Island, 20th; Posen, 11th; Oakbank, 26th; Emerson, 10th; Treherne, 11th; Rathwell, 14th; Pilot Mound, 19th; Wallace, N.W.T., 9th.

WILD DUCK.—Thedford, 25th; Fort Francis, 1st; Bognor, 22nd; Posen, 26th; Hillview, 24th; Pembina Crossing, 3rd; Little Current, 9th.

ROBIN.—Burk's Falls, 11th; Thompson, 10th; Kilmahumaig, 14th; Uplands, 9th, Fort Francis, 30th; Hillview, 28th; Treherne, 11th; Norway, 29th; Clontarf, 1st; Wallace, N.W.T., 20th; Little Current, 20th.

BLUE BIRD.—Pembina Crossing, 4th; Little Current, 9th.

BLACK BIRD.—Warton, 3rd; Kilmahumaig, 13th; Elkhorn, 20th; Posen, 29th; Oakbank, 11th; Pembina Crossing, 7th; Toronto, 4th; Wallace, N.W.T., 23rd.

CROWS.—Buda, 4th; Channel Island, 20th.

FROGS PIPING.—Calvin, 18th; Burk's Falls, 25th; Cayuga, 9th; Scarboro', 17th; Warton, 10th; Zurich, 1st; Kilmahumaig, 29th; Point Clark, 4th; Bancroft, 28th; Minden, 29th; Gravenhurst, 18th; Beatrice, 18th; Paris, 7th; De Cewsville, 1st; Orillia, 24th; Galt, 2nd; Bognor, 8th; Egremont, 9th; Elkhorn, 27th; Posen, 30th; Hillview, 29th; Oakbank, 30th; Emerson, 30th; Shoal Lake, 30th; Pembina Crossing, 30th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF APRIL, 1883.

HOURS ENDING

	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT.....		8	0.01	0.11	0.19	0.27	0.29	0.29	0.37	0.37	0.33	0.32	0.29	0.19	0.02	
AGASSIZ, B.C.....			.01	.04	.14	.22	.20	.22	.16	.18	.12	.10	.05	.03		
BRANDON.....			.07	.30	.32	.38	.40	.41	.43	.43	.42	.38	.32	.26	.09	
INDIAN HEAD.....		.04	.07	.15	.37	.60	.53	.53	.56	.49	.38	.30	.16	.11		
WINNIPEG.....		.14	.30	.44	.41	.41	.41	.44	.47	.48	.47	.45	.36	.07		
WOODSTOCK.....			8	.22	.44	.47	.46	.41	.42	.35	.29	.24	.19	.02		
TORONTO.....		.04	.25	.42	.43	.39	.52	.55	.49	.53	.43	.34	.33	.24	.03	
LINDSAY.....		.15	.24	.31	.41	.47	.53	.52	.52	.44	.35	.28	.22	.16	.8	
PARRIE.....		.05	.22	.38	.46	.51	.53	.54	.46	.43	.45	.13	.29	.22	.07	
KINGSTON.....		.16	.35	.35	.44	.47	.51	.57	.59	.57	.9	.57	.50	.39	.04	
MONTREAL.....		.01	.25	.46	.51	.45	.45	.46	.46	.50	.46	.32	.13	.01		
FREDERICTON.....		.08	.37	.48	.59	.48	.52	.57	.56	.53	.49	.45	.38	.28	.10	
SYDNEY.....																

	ESQUIMAULT	AGASSIZ	BRANDON	INDIAN HEAD	WINNIPEG	WOODSTOCK	TORONTO	LINDSAY	PARRIE	KINGSTON	MONTREAL	FREDERICTON	SYDNEY
MEAN PROPORTION FOR MONTH.....	0.23	0.11	0.31	0.30	0.38	0.26	0.38	0.38	0.37	0.44	0.42	0.43	
(Constant sunshine being 1.)													
MAXIMUM DAILY AMOUNT.....	0.82	0.76	0.87	0.84	0.91	0.67	0.85	0.96	0.84	0.80	0.97	0.90	
DAYS.....	39	26	10	28	14	12	13	18	19	6	9	20	
NO. OF DAYS COMPLETELY CLOUDED.....	8	15	10	3	10	10		7	4	4	7	6	

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 621. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	42	0	16	11	79.3
LOWE LAKE REGION.....	120	82	23	15	77.9
UPPER ST. LAWRENCE.....	105	80	16	7	85.4
LOWE ST. LAWRENCE.....	105	81	18	6	85.7
GULF.....	100	70	11	10	84.5
MARITIME PROVINCES.....	101	71	18	9	82.2
TOTAL.....	621	461	102	58	82.4

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions, the reports from the agents at the "Probability" stations, as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer B. C. Webber.

STORM WARNINGS.

During the month, warnings on the approach of five storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 91, all of which were verified. At 7 stations, however, the force exceeded that indicated by the signals; 12 stations reported warnings received late, owing to delay in issue, and 7 stations owing to delay in transmission.

In connection with the warnings, predictions as to the probable directions of the wind were given, and of the 91 warnings verified as to force, 84 were fully verified, and 87 were fully or partially verified as to direction.

No. 1. At 11 a.m. on the 1st, all maritime stations at which navigation was open, were warned in advance of a cyclone approaching from the west, to expect a moderate S.W. to N.W. gale, which occurred when the centre had passed over the maritime district.

No. 2. On the 11th at 11 a.m., stations on the western portion of Lake Ontario were warned for a moderate easterly gale. At the time, barometric gradients were steepening over the lakes, owing to the development of a cyclone over the Western States. The cyclone moved northeastward across the lakes, giving a fresh to strong gale in the lake district, on the 13th, from the S.W., during which the schr. "Hewsboro" dragged ashore at Burlington Beach.

No. 3. All Lake Stations, excepting on Lake Superior, were warned at 10 p.m. on the 19th for a strong gale, at first from the eastward, in advance of a cyclone then in the S.W. States, which eventually passed north-eastward across the lakes, causing a fresh to heavy gale from the eastward from the 19th to 21st. In many places it reached almost hurricane force; houses were unroofed at Midland, and it was reported as the heaviest storm for years at Port Hope and Owen Sound. At Presque Isle it reached a velocity of 60 to 80 miles for a short time. It blew 65 to 73 at Goderich, 60 at Toronto, and 60 at Pelee Island.

No. 4. Bay of Fundy and Atlantic Coast Stations were warned at 10 and 11 p.m. on the 20th for a moderate gale from the eastward, in consequence of a subsidiary cyclone to No. 3, which formed over the Middle Atlantic States. It caused a moderate gale from the S.E., in the district named and then dispersed.

No. 5. At 10.40 a.m. on the 26th, all lake stations were warned to expect a strong gale from the east, shifting to S. and S.W., in advance of a cyclone developing over the Middle States. An easterly gale set in during the 26th, which increased to a strong gale, shifting to S. and W. as the cyclone passed across the Lakes north-eastward to James Bay. Sixty miles an hour from the S.W. was recorded at Presque Isle; 42 S.W. at Goderich; Toronto, S.E. 39; and Pelee Island, E. 42.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR APRIL, 1893.

The first day was free from disturbance; slight disturbing action was shown on the 2nd, and on the morning of the 5th. After 2 p.m. the magnets steadied down and continued until 4.30 a.m., when slight disturbing action again appeared, lasting for a brief period. Disturbance of a similar nature appeared on the nights of the 6th and 7th. The magnets continued generally steady until the evening of the 11th, when slight irregularities began and were visible again the following evening. The nights of the 13th, 14th, 15th, 16th and 17th were similarly affected. From the morning of the 20th to the morning of the 24th, the magnets were free from disturbance. After 6 a.m. a small disturbance appeared, but it passed off by 11 a.m. The next important disturbance began after 10 a.m. of the 26th, the declination needle gradually moving west, and at 11.05 a.m. a marked westerly movement occurred, followed immediately by an easterly movement of 25'. The h. f. showed a slight change, and the vertical component hardly any, after 6.30 p.m. an increase of the v. f. component began lasting until 4 p.m. The h. f. increased rapidly after 1.30 p.m. and fell after 2.30, followed by another rise. After 4 p.m. a decrease of both forces began. In the case of the v. f. the decrease was more prolonged. After 6 p.m. the magnets quieted down, but at 9 p.m. a slight disturbance appeared, lasting about two hours, and appeared again on the 27th and morning of the 28th. From 8 a.m. of this day to the end of the month, the magnets were particularly steady. In fact the month was the quietest registered at the observatory for a long time.

There was no aurora visible during the month. On the 1st, 4th, 8th, 10th, 12th, 13th, 15th, 17th, 18th, 19th, 21st, 25th and 29th the sky was clear, but no aurora was observed. On all other nights, clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL

*Director.*

METEOROLOGICAL OFFICE,  
Toronto, May 10th, 1893.



## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

MAY, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The pressure was generally a little above average over the western portion of the United States and below over the rest of the Continent, the greatest difference below average being in Alberta and Saskatchewan and in the Ottawa Valley. In Manitoba and the North-west Territories the temperature was above average, and in all other districts either about average or a little below.

During the week ending May 6th pressure changes were comparatively unimportant in Manitoba and the North-west Territories, the pressure being generally somewhat above average in the former Province and lower further west. The weather continued fine, with day temperatures mostly ranging between  $50^{\circ}$  and  $60^{\circ}$ .

From the Lakes eastward the atmospheric conditions were more disturbed, and two areas of depression exerted a decided influence on the weather. The first of these having formed over the south-west States during the latter days of April, on the 1st approached the Lake Region where there was a general rain. During the 2nd the depression gradually dispersed while hovering over the Lakes, and a few scattered showers was the only rain reported on that day.

At 8 a.m. of the 3rd a more important cyclonic movement was apparent over the South Atlantic States, and by evening a well defined storm was central near Norfolk, Virginia, while a well marked anti-cyclone lay to the northward of Nova Scotia. From Virginia the storm took a northerly course to New Hampshire, and caused a heavy rain from central Ontario eastward to Cape Breton, accompanied on the Lakes by a fresh north-westerly gale, on the St. Lawrence by a north-easterly gale, and in the Maritime Provinces by a moderate east to south-east gale. On the 5th the storm centre moved very slowly eastward with diminishing energy, the weather cleared up in Ontario, and although it was mostly cloudy in the other Provinces, there were but a few light showers of rain. The 6th was a fine day, with moderate to fresh north-westerly winds from the Lakes to the Atlantic.

During the first portion of the week ending the 13th anti-cyclonic conditions were generally prevalent in the Dominion eastward from Manitoba, accompanied by very fine weather and day temperature ranging between  $55^{\circ}$  and  $65^{\circ}$ . At the same time cyclonic conditions spread over the North-west Territories, and for the first two days the temperature ranged between  $70^{\circ}$  and  $80^{\circ}$ , with fine weather; a change to cooler showery weather occurred in Alberta on the 8th, and during the two following days in Assiniboia and Manitoba. On the morning of the 11th the storm centre was in eastern Manitoba, and a cold north-westerly gale prevailed in that Province; then on the 12th it moved with diminished energy to the Lake Region, there bringing showers on that and following day. On the morning of the 13th an area of low pressure which had passed near Bermuda the previous day was centered off the Middle Atlantic Coast, and there was an area of high pressure over the northern part of the Gulf of St. Lawrence, before night the low pressure area coalesced with the one then over the Lake Region, forming an extensive but shallow depression, which accompanied by showers covered Ontario, eastern Quebec and southern portion of the Maritime Provinces, in which Provinces there was an east to north-east gale of short duration. Two days

later an important storm began to develop within this depression, the centre being in the Ohio Valley on the evening of the 15th; after this it developed very rapidly, moving directly towards Lake Ontario, causing during the 16th a heavy rainfall with fresh north-east to north-west gales, generally in the Lower Lake Region, and a north-east gale with rain along the St. Lawrence. During the 17th and 18th it moved very slowly eastward with decreasing energy, the rain continuing in Ontario until the evening of the 17th, and in Quebec and the Maritime Provinces during both days; there was a moderate easterly gale in the Maritime Provinces early on the 17th.

A storm developed over the western portion of the Continent during the 16th, 17th and 18th; as the centre moved eastward across the Canadian North-west Territories and Manitoba, a similar sequence of weather was experienced at the various points, namely, south-east to south-west gales with temperature between  $75^{\circ}$  and  $85^{\circ}$ , followed by cooler, showery weather. In Manitoba the storm was particularly heavy; at Winnipeg a temperature of  $80^{\circ}$  with a fresh south-east gale on the 19th was early on the following day followed by a violent westerly gale and a temperature of  $36^{\circ}$ . During the 20th and 21st it moved quickly across Northern Canada with diminishing energy, causing but a few local showers in the Lake Region and St. Lawrence Valley.

During the period, 20th to 30th, the weather in the North-west was tolerably settled, the first half of it being mostly anticyclonic and weather fine with temperature rather on the cool side; the other half of the period the conditions were mostly cyclonic, there were some local showers and on several days the temperature was between  $70^{\circ}$  and  $80^{\circ}$ .

An important area of depression which can be traced from the Pacific coast across Utah, Nebraska and Illinois entered the Lake Region on the 22nd, whence it passed east and north-east, causing some thunder storms followed by a west to north-west gale in Ontario early on the 23rd, and later on in the St. Lawrence Valley and Gulf of St. Lawrence. Another depression of lesser importance immediately followed, passing across the Lakes early on the 25th and thence down the St. Lawrence Valley; it caused some very light showers in Ontario and heavier showers in Quebec which were followed by strong north-westerly winds.

A feeble depression from the south-west moved into the Lower Lake Region early on the 27th, there causing some light local showers. On the following day it moved across the St. Lawrence Valley and Gulf, there giving more general and heavier showers. During the 29th and 30th, the pressure was generally a little below average and a few light showers occurred on the latter date.

On the 31st a marked anticyclonic development occurred over Eastern Canada and the Atlantic States, while west of the Lake Region and Mississippi Valley, cyclonic conditions became more pronounced.

#### TEMPERATURE.

The temperature has been, on the whole, slightly above the normal, but the differences were not large.

*The Highest and Lowest Temperatures in each Province during May were:*

British Columbia,  $88^{\circ}0$  on 15th at Fort Steele;  $20^{\circ}0$  on 1st at Salmon Arm.

North-west Territories,  $86^{\circ}0$  on 15th at Medicine Hat;  $+12^{\circ}8$  on 1st at Prince Albert.

Manitoba,  $61^{\circ}5$  on 18th at (Aweme) St. Albans;  $+22^{\circ}3$  on 25th at Brandon. *W. 11*

Ontario,  $87^{\circ}5$  on 12th at Ottawa;  $+14^{\circ}0$  on 14th at White River.

Quebec,  $88^{\circ}0$  on 23rd at St. Hyacinthe;  $+25^{\circ}0$  on 2nd at Anticosti, I.L.P.

New Brunswick,  $84^{\circ}0$  on 12th at Parker's Ridge;  $+26^{\circ}0$  on 3rd at Dalhousie.

Nova Scotia,  $82^{\circ}0$  on 12th at Pictou;  $20^{\circ}0$  on 3rd at Port Hastings.

Prince Edward Island,  $80^{\circ}4$  on 12th at Georgetown;  $27^{\circ}7$  on 9th at Kilmahumag.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, MAY, 1893.

[illegible]







## PRECIPITATION.

The rainfall in the Dominion has exceeded the average except in Prince Edward Island and the Territories, the excess being greatest in the eastern Part of Ontario.

*The General Distribution is as follows :—*

In BRITISH COLUMBIA the rainfall was in general 3·20 in., or about 1·74 above the average.

In the NORTH-WEST TERRITORIES, 1·38 in., about 1·03 in. below the average.

In MANITOBA the rainfall was 1·70 in., or 0·75 in. below the average.

In ONTARIO, West and South-west District it was 2·42 in., or 0·20 in. above the average. In the North and North-West District it was 2·85 in., or 0·30 in. above the average. In the Central District it was 3·78 in., or 1·90 in. above the average. And in the East and North-east District it was 4·33 in., or 2·02 in. above the average.

In QUEBEC it was 3·08 in., or 0·39 in. above the average.

In NEW BRUNSWICK it was 3·72 in., or 0·43 in. above the average.

In NOVA SCOTIA it was 3·36 in., or 0·01 above the average.

In PRINCE EDWARD ISLAND it was 1·58 in. or 1·43 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Port Simpson, 6·02 in.; Agassiz 6·57 in.; Abbotsford, 5·85 in.; Loch Erroch 7·44 in.; Hazelmere, 5·77 in.

ONTARIO.—Cartier, 6·71 in.; Sprucedale, 5·51 in.; Coldwater, 5·65 in.; Rockliffe, 5·84 in.; Kingston, 5·39 in.; Oliver's Ferry, 5·88 in.; Bancroft, 5·76 in.; Norwood, 5·16 in.; Clontarf, 6·48 in.; Stony Creek, 5·16 in.; Renfrew, 5·11 in.; Paris, 5·09 in.

QUEBEC.—Point des Monts, 5·40 in.

NEW BRUNSWICK.—Parker's Ridge, 5·65 in.

NOVA SCOTIA.—Port Hastings, 5·18 in.; Halifax, 5·06 in.

BERMUDA. 8·57 in. Channel, NEWFOUNDLAND, 5·43 in.

*Rainfall 1 inch and upwards in 24 hours :—*

1. Paris, 1·58 in.; Little Current, 1·22 in.
2. Bancroft, 1·93.
3. Norwood, 1·40 in.; Peterborough, 1·55 in.
4. St. Hyacinthe, 1·07 in.; Denbigh, 1·05 in.; Ennismore, 1·75 in.; Orillia, 1·15 in.; Brome, 1·24 in.; Oliver's Ferry, 1·64 in.; Kingston, 1·17 in.; Alexandria, 1·62 in.
5. Richmond, 1·25 in.; Channel, Nfld., 1·39 in.; Little Fork, 1·00 in.; Port Simpson, 1·29 in.
6. Abbotsford, 1·14 in.
7. Hazelmere, 1·47 in.; Loch Erroch, 1·73 in.; Agassiz, 1·59 in.
10. Denbigh, 1·20 in.; Channel, Nfld., 1·00 in.
11. Emerson, 1·00 in.; Posen, 1·19 in.; Oak Bank, 1·80 in.; Portage la Prairie, 1·70 in.; Rosebank, 1·00 in.; Posen, 1·19 in.; Beaver Creek, 1·17 in.; Port Simpson, 1·26 in.; Winnipeg, 1·48 in.
12. Pelee Island, 1·50 in.; Barclay, 2·30 in.; Greenwood, 1·55 in.; Foxton, 1·03 in.; Fort Frances, 1·18 in.; Bermuda, 1·68 in.
13. Port Hastings, 1·50 in.; Oak River, 1·13 in.
14. Port Hastings, 1·50 in.; Point Lepreaux, 1·11 in.
15. Georgina, 1·15 in.
16. Deer Park, 1·21 in.; Denbigh, 1·30 in.; Watford, 1·00 in.; Scarboro, 2·30 in.; Georgetown, 1·30 in.; Aurora, 2·30 in.; Ennismore, 1·15 in.; Conestogo, 1·20 in.; Barrie, 1·00 in.; Clontarf, 1·40 in.; Welland, 1·77 in.; Peterborough, 1·75 in.; Nottawsaga Island, 1·60 in.; Shannonville, 1·30 in.; Renfrew, 2·59 in.; Orillia, 1·42 in.; Port Rowan, 1·69 in.; Parker's Ridge, 1·03 in.; Oliver's Ferry, 1·76 in.; Coldwater, 1·28 in.; Woodstock, 2·44 in.; Port Stanley, 1·17 in.; Port Dover, 1·15 in.; Lindsay, 1·18 in.
17. Niagara Falls, 8, 1·15 in.; Elora, 1·76 in.; Loch Erroch, 1·22 in.; W.P., Anticosti, 1·54 in.; Deer Park, 1·37 in.; Presque Isle, 2·05 in.; Coldstream, 1·89 in.; Cayuga, 2·98 in.; Fergus, 1·36 in.; Bloomingdale, 2·11 in.; Thedford, 1·78 in.; Lion's Head, 1·42 in.; Warton, 1·37 in.; Watford, 1·01 in.; Ennismore, 1·00 in.; Wyoming, 1·35 in.; Lyons, 2·63 in.; Orangeville, 1·40 in.; Wilton Grove, 1·54 in.; Bancroft, 1·79 in.; Galt, 2·16 in.; Haliburton, 1·07 in.; Norwood, 1·61 in.; Clontarf, 1·84 in.; Welland, 1·03 in.; Stony Creek, 2·41 in.; Minden, 1·18 in.; St. George, 2·13 in.; De Cewsville, 2·15 in.; Toronto, 2·33 in.; Nottawsaga Island, 1·20 in.; Point Clark, 1·26 in.; Owen Sound, 2·00 in.; Paris, 1·05 in.; Rockliffe, 1·87 in.; Grand Manan, 1·48 in.; Chatham, 1·16 in.; Collingwood, 2·66 in.; Lakefield, 1·15 in.; Port Rowan, 1·10 in.; Parker's Ridge, 1·40 in.; North Bruce, 1·02 in.; Point Lepreaux, 1·59 in.; Agassiz, 1·01 in.; Digby, 1·00 in.; Bicquet, 1·00 in.; Yarmouth, 1·09 in.; Saugeen, 1·24 in.

18. Niagara Falls, S., 1.47 in.; Lock Erroch, 1.06 in.; W.P., Anticosti, 1.01 in.; Esquimaux Point, 1.00 in.; Little Forks, 1.00 in.; Fredericton, 1.33 in.; Bermuda, 2.30 in.
19. Brandon, 1.25 in.; Channel, Nfld., 1.11 in.; Qu Appelle, 1.06 in.; Bermuda, 1.24 in.
22. Fergus, 1.00 in.
23. Lion's Head, 1.00 in.; Burk's Falls, 1.26 in.; Calvin, 1.12 in.; Glastonbury, 1.00 in.; Pelee Island, 1.00 in.; Sprucedale, 1.18 in.; Little Current, 2.10.
24. Sprucedale, 1.90 in.
25. Cartier, 1.20 in.; Little Forks, 1.10 in.
27. Little Forks, 1.00 in.
28. Point des Monts, 1.50 in.; Rosebank, 1.52 in.; Little Forks, 1.00 in.
31. Fort Steele, 1.00 in.; Bermuda, 1.57 in.

*Thunder recorded on the following dates :—*

2. Pembina Crossing.
5. Wyoming.
8. Henrietta.
12. Orillia, Whiteside, Pembina Crossing, Rapid City, Roseberry, Cottam, Peterboro', Lindsay, Pelee Island, Norwood, Haliburton, Bancroft, Calvin, Thompson, Scarborough, Burk's Falls.
13. Orillia, Whiteside, Pembina Crossing, Rapid City, Treherne, Uplands, Beatrice, Barrie, Bancroft, Calvin, Scarborough, Burk's Falls, Elkhorn, St. Albans, Gravenhurst, Coldwater, Georgina.
14. Ridgetown, Pelee Island, Georgina.
15. Glenbow, Clontarf, Bancroft, Blenheim, Calvin, London, Ottawa, Lindsay.
16. Griffin Lake.
17. St. Albans, Medicine Hat, Swift Current.
18. Norquay, Roseberry, Hillview, Treherne, Morden, Peterborough, Turtle Mountain, Glen Adelaide, Posen, Elkhorn, Brandon.
19. Hillview, Peterborough, Pelee Island, Scarborough, Posen, Elkhorn.
20. Orillia, Lucknow, Beatrice, Point Clark, Minden, Peterboro', Egremont, Welland, Clontarf, Barrie, Bancroft, Georgetown, Cayuga, Midland, Point Escuminac, Elora, Bognor, Port Rowan, Toronto, Coldwater, Woodstock, Lindsay.
21. Glenbow, Kilmahumag, Lindsay.
22. Whiteside, Uplands, Novar, Calvin, Burk's Falls, Parker's Ridge, Calgary, Little Current.
23. Orillia, Lucknow, Uplands, Beatrice, Cartier, Point Clark, Minden, Peterboro', Egremont, Stony Creek, Welland, Clontarf, Novar, Pelee Island, Barrie, Bancroft, Blenheim, Mount Forest, Calvin, Cowal, Thompson, Georgetown, Scarboro', Elora, Chicoutimi, Richmond, Bognor, Brome, Port Rowan, Gravenhurst, Burk's Falls, Wiarton, Lion's Head, Princeton, Cayuga, Presque Isle, Midland, Shannonville, Toronto, Coldwater, Lennoxville, Father Point, Lindsay, Alexandria, Deseronto.
24. Glenbow.
25. Beatrice, Fredericton, Alexandria.
26. Pelee Island, Digby.
27. Roseberry, Hillview, Scarborough, Posen, Qu'Appelle, Regina.
28. Fort Frances, Treherne, Emerson, French Creek, St. Albans.
29. Wyoming, Thedford.
30. Clontarf.
31. Glenbow, Rosebank, Selkirk, Oakbank, Pembina Crossing, Treherne, Bancroft, Emerson, St. Albans, Minnedosa, Alexandria, Regina.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

3. Channel Island, IV; Savanne.
4. Hillview.
5. Channel Island, IV; Saskatoon, II; Pembina Crossing, IV.
6. Savanne, Pembina Crossing, IV; Fort Frances, Alexandria, III.
7. Gravenhurst, III; St. Albans, II; Elkhorn, I; Henrietta, III; Oakbank, II; Brandon, Channel Island III; Bancroft, III; Galt, Novar, III; Clontarf, IV; Egremont, III; Pembina

Crossing, III; Lucknow, IV; Toronto, III; Coldwater, I; Fredericton, III; Port Arthur, I; Minnedosa, III; Prince Albert, IV; Lindsay, IV; Alexandria, II.

8. Elkhorn, II; Calvin, Clontarf, IV; Welland, III; Savanne, Pembina Crossing, IV; Hillview, Coldwater, II; Father Point, III; Minnedosa, IV; White River, IV; Prince Albert, IV.

9. Gravenhurst, III; St. Albans, III; Elkhorn, II; Oakbank, III; Posen, II; Brandon, Channel Island, IV; Cape Norman, III; Burk's Falls, II; Bancroft, IV; Galt, Conestogo, Barrie, Novar, IV; Welland, II; Peterboro', III; Savanne, Pembina Crossing, Hillview, Toronto, IV; Port Arthur, III; Yarmouth, IV; Swift Current, II; Minnedosa, III; Alexandria, II.

10. Georgetown, P.E.I., Welland, III; Rapid City, Little Forks, III; Port Arthur, I; Minnedosa, II.

11. Rapid City, Little Forks, IV.

12. Gravenhurst, IV.

13. Cape Norman, II.

14. Elkhorn, II; Oakbank, III; Pembina Crossing, II; Hillview.

15. Elkhorn, II; Posen, III; Savanne, Pembina Crossing, IV; Hillview, Prince Albert, II.

16. Posen, IV; Savanne, Pembina Crossing, IV; Port Arthur, III.

17. Posen, IV.

18. Barrie, Savanne, Portage la Prairie.

19. Savanne, Father Point, IV.

20. Elkhorn, II; Posen, III; Savanne, Battleford, IV.

21. Pembina Crossing, IV.

24. Savanne, Quebec, IV.

25. Savanne, Quebec, IV; Point Escuminac.

31. Portage la Prairie.

*Frost occurred on :*

1. Savanne, Glenbow.

2. Anticosti Heath Point.

3. Donald.

4. Savanne.

5. Bognor, Salmon Arm, Savanne.

6. Emerson, Savanne, Glenbow.

7. Mount Forest, Savanne.

8. Chatham, (Ont.), Egremont, Uplands, Richmond, Kilmahumag, Dalhousie.

9. Barrie, Kilmahumag.

10. Vernon.

11. Donald, Fort Steele.

13. Glenbow.

14. Turtle Mountain, Quesnelle, B.C.

15. Hillview.

17. Savanne.

18. Cowal, Peterboro', Shannonville.

19. Barrie, Wharton, Clontarf, Peterboro', Cottam, St. Marys, Lucknow, Egremont.

29. Peterboro', Uplands, Brome.

21. Saskatoon, Channel Island, Posen, Oakbank, Oonikup.

22. Barrie, Channel Island, Posen, Oakbank, Oonikup, St. Albans.

23. Brandon, Saskatoon, Glen Adelaide, Turtle Mountain, Channel Island, Oakbank, Oonikup, Chaplin, Elkhorn.

24. Hillview, Galt, Chatham, Brandon, (Ont.), Saskatoon, Glen Adelaide, Shoal Lake, Gretna, Turtle Mountain, Channel Island, Posen, Oakbank, Oonikup, Elkhorn, Glacier, Salmon Arm, Cottam, Ridgetown, Lucknow, Egremont, Savanne, St. Albans.

25. Brandon, Saskatoon, Channel Island, Posen, Oakbank, Elkhorn, Glacier, Donald, Fort Steele, Orillia, Savanne, St. Albans, Fort Francis.

26. Alexandria, Barrie, Galt, Scarboro', Gravenhurst, Donald, Sprucedale, Savanne, Haliburton, Clontarf, Peterboro', Beatrice, Lucknow, Renfrew, Egremont, Novar, Uplands, Minden, Fort Francis, Brome, Richmond, Georgina.

27. DeCewsville, Chicomitimi, Brome, Richmond, Parker's Ridge.

28. DeCewsville.

29. Peterboro', Novar.  
 30. Savanne.  
 31. Barkerville, Peterboro', Minden.

*Migration of Spring Birds, &c. :—*

YELLOW BIRDS.—Bognor, 13th ; Egremont, 23rd ; Cayuga, 11th ; Thedford, 7th.

SWALLOWS.—Bognor, 14th ; Keremeos, 7th ; Kilmahumaig, 2nd ; Fort Frances, 1st ; Minden, 31st ; Egremont, 3rd ; Cottam, 1st ; Thedford, 15th ; Cowall, 4th ; Burk's Falls, 16th ; Barrie, 3rd ; Posen, 18th ; Shoal Lake, 15th.

HUMMING BIRDS.—Bognor, 25th ; Minden, 29th ; Lucknow, 15th ; Cottam, 9th ; DeCewsville, 9th ; Thedford, 22nd ; Cowal, 20th.

SAND-HILL CRANE.—Keremeos, 8th.

ROBINS.—Savanne, 8th ; Posen, 1st ; Channel Island, 6th.

KING BIRDS.—Kilmahumaig, 12th.

BLUE BIRDS.—Thedford, 3rd.

POLOVER.—Fort Frances, 2nd.

WHIP-POOR-WILL.—Minden, 26th ; Egremont, 26th ; Clontarf, 13th ; Cowal, 12th ; Galt, 19th.

NIGHT HAWK.—Minden, 27th ; Egremont, 23rd.

ORIOLE.—St. Mary's, 11th ; Cottam, 5th ; DeCewsville, 11th ; Cayuga, 11th ; Thedford, 14th.

FROGS PIPING.—Fort Frances, 15th ; Savanne, 12th ; St. Mary's, 1st.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF MAY, 1893.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....	..	0.06	0.19	0.17	0.29	0.32	0.33	0.43	0.49	0.52	0.49	0.43	0.44	0.39	0.12	..
AGASSIZ.....	..	.04	.18	.24	.27	.32	.35	.34	.31	.29	.31	.30	.25	.20	8.	..
BRANDON.....	..	.24	.53	.63	.67	.80	.75	.73	.82	.74	.71	.66	.61	.64	.43	8.
INDIAN HEAD.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
WINNIPEG.....	8.	.50	.58	.67	.68	.74	.70	.77	.73	.73	.75	.69	.64	.41	8.	..
WOODSTOCK.....	..	.20	.35	.49	.54	.56	.54	.48	.51	.51	.53	.46	.38	.33	.12	..
TORONTO.....	..	.42	.53	.59	.57	.52	.56	.58	.57	.53	.50	.50	.51	.50	.24	..
LINDSAY.....	.01	.30	.44	.49	.53	.51	.51	.53	.58	.55	.47	.49	.47	.45	.40	16
BARRIE.....	..	.50	.49	.53	.52	.54	.53	.60	.61	.54	.56	.55	.59	.55	.32	8.
KINGSTON.....	..	.27	.50	.54	.55	.57	.61	.58	.57	.57	.58	.55	.51	.44	.26	..
MONTREAL.....	8.	.28	.49	.50	.49	.49	.44	.42	.41	.38	.40	.45	.39	.29	.10	..
FREDERICTON.....	..	.15	.30	.34	.47	.55	.53	.48	.52	.50	.46	.46	.46	.41	.17	8.
SYDNEY.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.31	0.22	0.22	0.28	0.31	0.31	0.31	0.40	0.46	0.46	0.49	0.48	0.42	0.42	..	..
MAXIMUM DAILY AMOUNT.....	0.78	0.81	0.85	0.85	0.85	0.85	0.85	0.94	0.90	0.88	0.90	0.93	0.90	0.97	0.88	..
DATE.....	8-24	25	3	..	..	..	..	4	8	9	10	28	10	22	23	11
NO. OF DAYS COMPLETELY CLOUDED.....	7	10	..	..	..	..	..	1	8	4	6	4	6	10	0.88	..

## PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 605. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOTA .....	93	79	19	4	90.3
LOWER LAKE REGION .....	116	92	16	8	85.2
UPPER ST. LAWRENCE .....	102	84	11	7	87.7
LOWER ST. LAWRENCE .....	101	86	9	6	89.6
GULF .....	97	72	13	12	80.9
MARITIME PROVINCES .....	96	73	16	7	84.4
TOTAL .....	605	486	75	44	86.5

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer R. F. Stupart.

## STORM WARNINGS.

During the month, warnings on the approach of six storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 183, of which 157 were verified. At 9 stations, however, the force exceeded, and at 10 did not reach that indicated by the signals displayed: 6 stations reported warnings received late, owing to delay in issue, and 1 station to delay in transmission; 5 stations reported storms for which no warnings were sent.

In connection with the warnings, predictions as to the probable direction of the winds were given, and of 157 warnings verified as to force 137 were fully verified, and 156 were fully and partially verified, as to direction.

1. At 10 p.m. on the 3rd cones were ordered for all Lakes except Superior for a moderate N.E. and N.W. gale; at the same time River and Bay stations were warned for a heavy, and the Bay of Fundy for a moderate, easterly gale, and next morning at 10.30 the warning for a moderate easterly gale was further extended to Gulf and Ocean stations. These warnings were issued in advance of an important disturbance moving up the Atlantic coast. The disturbance reached its maximum intensity when in the vicinity of the New England States, and then became unimportant. Between the 3rd and 4th it caused a gale from the Lakes to the Atlantic, which in certain localities was very heavy, especially in the Lower St. Lawrence Valley, where in some places it is reported to have reached hurricane force. Signals were lowered during the evening of the 5th.

2. During the evening of the 11th cones for a moderate gale were ordered for all Lake stations owing to the approach of a comparatively important disturbance from the North-west. Afterwards the disturbance decreased much in energy, and a moderate gale was only experienced at one or two places on Lake Huron and the western portions of Lake Erie. Signals were lowered on the night of the 12th.

3. Lawrence and Ocean stations were warned for a moderate easterly to north-easterly gale at 10 a.m. on the 13th, a storm of some magnitude being then indicated in the neighbourhood of Bermuda. That night a gale from the eastward prevailed over the districts notified, attended by heavy rains. At many places the storm was very severely felt. The schooner "Angelia" was stranded on Scatterie Island, and much damage was done ashore. Signals were lowered on the morning of the 14th.

4. Lakes Erie and Ontario were warned on the morning of the 16th for a moderate westerly gale; Bay stations for a heavy, and Gulf, Scotia and Fundy stations for a moderate easterly to north-easterly storm. A developing depression over the Ohio Valley caused the issue of these warnings, and afterwards, as an important disturbance, it moved slowly over the Lake Region, and then, with less energy, down the St. Lawrence Valley. In many portions of the Lake Region the storm experienced is reported to have been severe, but in Eastern Canada, although tolerably general, it was, as a rule, not heavy. Signals were lowered during the night of the 17th and early on the 18th.

5. Port Arthur, on Lake Superior, was warned for a heavy easterly gale at 10.20 a.m. on the 19th, owing to a very deep disturbance over Dakota. Afterwards, the disturbance passed to the northward of Lake Superior, and on the 20th it caused a south-westerly gale at Port Arthur. The signal was lowered on the evening of the 20th.

6. All Lakes, except Superior, were warned at 10.10 p.m. on the 22nd for a moderate westerly gale, owing to a developing depression then over the Upper Lakes. The next morning signals for a heavy westerly to northerly gale were substituted for the cones as the storm had assumed grave proportions, and, at the same time, Father Point was notified to expect a heavy easterly to north-easterly storm. During the evening and night of the 23rd, and early on the 24th a heavy gale from the west and north was experienced over the Lake Region. On the 24th, also, a heavy westerly gale prevailed in the Lower St. Lawrence Valley. Signals were lowered during the night of the 23rd and morning of the 24th.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR MAY, 1893.

The first two days were entirely free from disturbance. After 5 a.m. of the 3rd, the magnets became slightly disturbed, and were also unsteady on the two following mornings. On the night of the 7th, a moderate disturbance was registered. The 8th and 9th were also unsteady. After 7 p.m. of the 9th there were several sharp swings of the declination magnet, attended by a considerable decrease of the vertical force. From the 11th to the night of the 13th, the magnets were fairly steady. Previous to the 10 p.m. observation on the 13th the declination magnet was rather unsteady but quieted down shortly afterwards. During the remainder of the month there was a marked absence of any important disturbance.

On the 7th, auroral light from 9.30 p.m., auroral arch and some streamers 10.10 to 10.50. On the 9th, faint auroral light. On the 8th, 10th, 11th, 12th, 18th, 19th, 20th, 23rd, 25th, 26th, 27th, 28th, 30th, 31st, the sky was clear, but no aurora was observed. On all other nights, clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL

*Director.*

METEOROLOGICAL OFFICE,  
Toronto, July 10th, 1893.





## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

JUNE, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The area of mean atmospheric pressure of the greatest departure above average ('05 to '10) lay over Quebec and the Maritime Provinces, while the area of mean lowest pressures below average ('05 to '10) covered Manitoba and the North-West Territories.

No extreme cyclonic or anti-cyclonic movements occurred during the month, and no storm of any importance has been tracked for any distance.

At the commencement of the month, high pressure generally covered the country east of the Lakes, and cyclonic conditions were prevalent over the whole Western States and our North-west. There was little change in the pressure distribution until the evening of the 3rd. A few showers fell in the North-west and the Lake districts on the 1st and 2nd; then showers became more general in Manitoba and also in Ontario and Quebec.

On the 4th the anti-cyclone passed southward, cyclonic conditions obtained over the Lake and Eastern Canada, and until the 6th, low pressure extended from Manitoba to Nova Scotia. The weather was for the most part fair: there were a few local showers, and it was generally warm from the Lakes eastward. At the same time an anti-cyclone over Alberta and Assiniboia was causing cool weather in the Territories. This moved south-eastward, passing partly over and to the south of the Lakes, causing the weather to clear up there on the night of the 6th, and next day higher pressure with fine pleasant weather was general from the Lakes to the Atlantic. This was not disturbed till the night of the 9th, when a cyclone which passed over the North-west Territories on the 6th and 7th, accompanied by warmer weather and local thunder storms, moved into the Lake district, where it caused a few local thunder storms. Then crossing over Eastern Canada during the 10th it was also the cause of showers there.

On the evening of the 10th a small depression developed over the Lower Lakes, causing showers and thunder storms in Ontario. Next day it passed eastward and dispersed off the New England Coast on the 12th, after giving some showers in Western Quebec.

This was followed by a general increase of pressure and a period of fine warm weather till the night of the 15th from the Lakes to the Atlantic.

In the North-west, after the 7th, a slight increase in pressure took place with fair, cooler weather and local showers in Manitoba. This was soon followed by cyclonic conditions, and a flow of warmer southerly winds set in, the temperature rising above 90° in Manitoba on the 11th and 12th; but on the 13th, owing to the development of a cyclone over Wyoming, which passed northward across the Territories with increasing energy, the wind shifted to the S. and W. and increased to a moderate to fresh gale, and a few heavy showers fell in Assiniboia and Alberta. Cyclonic conditions continued till the 15th, with westerly winds and occasional local showers.

A general decrease in pressure took place over the Lake district on the 15th, and local showers and thunder storms occurred during the night. For the next two days, although there were a few local showers, the weather was generally fair and warm, whilst over Eastern Canada higher pressure and fine cooler weather prevailed. Then a general increase in pressure set in over the Lake district, and an unbroken period of fine decidedly warm weather lasted till the 21st: the temperature rising to 91° at Toronto on the 19th.

The fine weather in Eastern Canada was disturbed on the 18th by a cyclone which moved up the Atlantic coast and dispersed over the Maritime Provinces. It was the cause of some rain in Nova Scotia, but the weather soon cleared up again, and fair weather with low pressure continued for several days.

In the North-west fine, moderately warm weather was the rule after the 15th, with pressure about normal till the 17th, when a general decrease in pressure took place, and on the 18th local thunder storms were reported, more particularly in Manitoba. On the 20th there was a movement eastward of the low pressure area, and a little lower temperature with westerly winds was the rule, some showers falling in Manitoba.

On the 21st the pressure was below normal from the Rocky Mountains to the Atlantic, and the weather became unsettled in the Lake district.

An area of some importance formed to the north of the Lakes on the 22nd, causing local showers and fresh to strong westerly winds in that district, but by night the depression had become unimportant. It caused some showers in Quebec and then moved south-eastward, joining a small subsidiary area which formed over the middle Atlantic coast. It passed out to sea without affecting the Maritime Provinces, where a small anti-cyclone kept the weather fair and comparatively cool till the 25th.

There was an increase in pressure in the Lake district on the 22nd, and fine weather continued till the night of the 24th. Then the weather was disturbed by a cyclone which developed over the North-west on the 23rd, giving thunder showers and high S. E. veering to N. W. winds in Manitoba. That day Qu'Appelle reported a fall of 1.73 in. of rain. The cyclone passed to the lakes, over which it moved very slowly, causing unsettled, showery weather there from the 25th till the 27th, when it dispersed over Ontario. Some rainfalls were excessive, Kingston reported a fall of 1.38 in., and Rockliffe a fall of 1.14 in. in 24 hours. This cyclone also caused some showers in western Quebec on the same day.

Fine weather, with anti-cyclonic conditions continued over eastern Canada with moderate winds and slowly increasing temperature. This anti-cyclone spread westward to the lakes on the 27th, and fine, pleasant weather continued to the end of the month from the lakes to the Atlantic.

After the passage of the cyclone eastward from Manitoba on the 23rd, with the exception of a few showers in the Red River Valley, the weather was fine and warm. The conditions became somewhat more cyclonic on the 26th, causing showers throughout the Territories. It became very warm in Manitoba, the temperature rising to 88° at Minnedosa. The cyclone hovered over the North-west till the end of the month, the weather being fair, but showery.

#### TEMPERATURE.

The average temperature in the North-west Territories and British Columbia was below the average: in all other parts of the Dominion it was above the average.

*The Highest and Lowest Temperatures in each Province during June were:*

British Columbia, 90° on 5th at Agassiz: 20° on 10th at Donald, on the 18th at Glacier.

North west Territories, 93° on 11th at Oonikup: 25° on 18th at Banff.

Manitoba, 98° on 11th at Aweme: 35° on 6th at Oakbank, on the 9th at Fort Ellice.

Ontario, 100° on 14th at Sudbury: 30° on 10th at White River.

Quebec, 87° on 30th at Chicoutimi: 32° on 1st at Chicoutimi.

New Brunswick, 91° on 14th at Chatham: 30° on 28th at Fredericton and Parker's Ridge.

Nova Scotia, 86° on 14th at Halifax: 51° on 3rd at Truro.

Prince Edward Island, 86° on 14th at Kilmahumag: 32° on 28th at Kilmahumag.





Quarry—Continued.	32-2	1	6	3	0	39	0	1	0	50	0	90	IV	VII	TNW	2-58	-1.71	7.24	1	1
Quebec—Continued.																				
Chicoutimi.....	67.1	+ 8.0	17.87-1	30	46.5	8	18	6	31.7	.....	6	8	17	7	3	0	38	7	3	0
Quebec.....	65.8	+ 2.9	19.51-9	13	39.5	28	24	9	34.9	52.0	66	5	6	3	20	13	8	3	28	10
Quebec.....	61.1	+ 1.8	19.91-5	14	39.5	28	25	24.0	.....	4	3	2	1	5	8	0	13	8	23	60
Cape Norman.....	41.4	—	1.6	10.54-0	17	33.0	16	37.9	35.0	.....	4	1	0	4	2	10	11	0	8	82
Brone.....	64.9	+ 1.1	13.04-0	21	40.0	8	19	8.35-0	.....	3	4	0	38	8	7	3	7	24	0	90
Father Point.....	55.7	+ 2.3	19.73-8	1	35.8	16	19	8.35-0	.....	4	7	6	5	7	12	0	11	25	7	14
Point des Monts.....	60.0	+ 4.6	9.78-0	10	58.0	7	.....	.....	.....	8	34	3	0	8	30	0	6	20	2	60
Cape Chatter.....	59.1	+ 3.9	9.75-0	14	49.0	6	.....	.....	.....	1	3	11	0	1	30	10	0	34	30	0
Bequet.....	53.2	+ 3.2	9.05-0	20	46.0	24	.....	.....	.....	0	34	1	4	0	35	6	1	1	1	90
Cape Magdalen.....	57.4	+ 3.3	10.78-0	6	46.0	.....	.....	.....	.....	1	7	1	5	26	5	1	22	27	90	.....
Anticosti, H.P.....	49.7	+ 1.7	10.00-0	28	40.0	1	.....	.....	.....	23	0	0	0	1	5	56	3	0	0	30
New Brunswick.....																				
Fredericton.....	30.01	30.32	29.63	0.94	62.2	28	24	9	34.9	52.0	66	5	6	3	20	13	8	3	28	10
Chatham.....	30.00	30.33	29.66	0.99	61.1	+ 1.8	19.91-5	.....	.....	4	3	2	1	5	8	0	13	8	23	60
Bathurst.....	30.00	30.32	29.70	0.92	65.8	+ 2.6	19.94-0	.....	.....	4	1	0	4	2	10	11	0	0	8	82
St. Andrews.....	30.00	30.32	29.56	0.94	57.5	+ 0.5	19.83-6	.....	.....	3	0	1	7	4	8	2	0	5	30	00
St. John's.....	30.01	30.33	29.70	0.95	53.7	+ 0.7	19.83-6	.....	.....	1	15	8	31.6	.....	.....	.....	.....	.....	.....	.....
St. John (City).....	30.01	30.33	29.66	0.97	53.7	+ 0.6	19.83-6	.....	.....	5	4	2	3	15	8	2	16	12	8	9
Dalhousie.....	30.01	30.33	29.66	0.97	54.7	+ 2.4	13.83-0	.....	.....	82	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Parkville.....	30.01	30.33	29.66	0.97	54.7	+ 2.4	13.83-0	.....	.....	82	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Parkville.....	30.01	30.33	29.66	0.97	54.7	+ 2.4	13.83-0	.....	.....	82	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Parkville.....	30.01	30.33	29.66	0.97	54.7	+ 2.4	13.83-0	.....	.....	82	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Parkville.....	30.01	30.33	29.66	0.97	54.7	+ 2.4	13.83-0	.....	.....	82	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Parkville.....	30.01	30.33	29.66	0.97	54.7	+ 2.4	13.83-0	.....	.....	82	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Parkville.....	30.01	30.33	29.66																	

<b>NEW BRUNSWICK:</b>																		
Fredricktown	30 01 30 32 29 63	0 99	62 21	1 55 20 87 9	13	39 0	28 24 9 34 9 52 0	68	5 6	3 20 13 8 3 28 10 4 1 93	6 5	11 0	14 SW	2 32	-0 45	6 24	0 1	
Chatham	30 00 30 35 29 66	0 93	61 1	1 58 19 04 0	14	39 5	16 25 2 40 0	.....	4 3	0 1 42 10 0 11 8 23 60	.....	7 0	24 W	0 75	-2 01	9 21	0 0	
Bartholomew	30 00 30 32 29 70	0 52	61 1	2 02 29 70 0	0 52	41 0	16 23 35 0	.....	4 1	0 1 52 10 0 11 0 9 8 82	.....	.....	9 A	0 44	-2 16	5 25	0 1	
St. Andrews	30 00 30 29 29 65	0 64	57 5	0 5 19 53 6	29	41 0	16 21 34 4	.....	4 1	3 1 4 5 6 3 5 30 60	.....	.....	.....	1 65	-1 49	14 16	0 3	
Grand Manan	30 02 30 13 29 70	0 43	57 5	0 4 9 52 6	20	42 0	1 15 8 31 6	.....	5 3	5 1 4 9 7 7 3 11 60	.....	29 0	9 SE	2 12	-0 69	14 16	0 0	
Point Lepreau	30 01 30 33 29 66	0 67	53 7	0 6 17 80 0	20	45 0	1 15 8 31 6	.....	5 4	2 18 8 2 16 12 8 9 78	.....	.....	11	1 53	-0 85	5 25	0 12	
St. John (City)	30 01 30 33 29 66	0 67	54 7	0 4 33 83 0	20	45 0	16 14 9 34 9	.....	83	6 14 9 34 9	.....	3 6	8 8	1 8 W	0 89	-2 47	-0 0	0 8
Dalhousie	30 01 30 33 29 66	0 67	54 7	0 4 33 83 0	20	45 0	2 25 0 38 0	.....	4 4	0 15 0 6 0 21 6	.....	1	5 E	1 76	-2 86	2 26	0 10	
Parker's Ridge	30 01 30 33 29 66	0 67	54 7	0 4 33 83 0	20	45 0	28 24 6 38 0	.....	4 4	0 15 0 6 0 21 6	.....	24	60	1	-2 32	25 0	0 3	
<b>NOVA SCOTIA:</b>																		
Halifax	30 05 30 30 29 62	0 77	57 8	0 1 19 84 2	14	38 4	28 21 9 32 1	.....	6 5	8 4 7 4 2 0 13 5	.....	17	69	1 76	-0 96	10 20	0 6	
Sydney	29 58 30 29 29 48	0 72	56 7	1 5 5 19 56 0	14	32 0	16 20 8 45 0	.....	6 5	4 7 3 3 7 15 2 11 2	.....	2	60	0 78	-2 78	3 27	0 0	
Yarmouth	30 03 30 30 29 70	0 63	53 4	0 5 16 74 0	13	40 0	17 16 4 28 7	.....	7 6	1 9 6 15 5 8 4 60	.....	10 0	10 S	3 65	-1 17	11 0	0 14	
Peterborough	30 03 30 30 29 71	0 84	58 9	0 1 29 78 2	17	31 3	25 6 43 2	.....	6 5	3 13 6 3 12 10 15 6 4	.....	80	11	1 43	-1 71	6 21	0 1	
Antigonish	30 03 30 30 29 71	0 84	58 9	0 1 29 78 2	17	31 3	25 6 43 2	.....	6 5	3 13 6 3 12 10 15 6 4	.....	80	11	1 43	-1 71	6 21	0 1	
St. John's	30 03 30 30 29 71	0 84	58 9	0 1 29 78 2	17	31 3	25 6 43 2	.....	6 5	3 13 6 3 12 10 15 6 4	.....	80	11	1 43	-1 71	6 21	0 1	
St. John's	30 03 30 30 29 71	0 84	58 9	0 1 29 78 2	17	31 3	25 6 43 2	.....	6 5	3 13 6 3 12 10 15 6 4	.....	80	11	1 43	-1 71	6 21	0 1	
St. John's	30 03 30 30 29 71	0 84	58 9	0 1 29 78 2	17	31 3	25 6 43 2	.....	6 5	3 13 6 3 12 10 15 6 4	.....	80	11	1 43	-1 71	6 21	0 1	
St. John's	30 03 30 30 29 71	0 84	58 9	0 1 29 78 2	17	31 3	25 6 43 2	.....	6 5	3 13 6 3 12 10 15 6 4	.....	80	11	1 43	-1 71	6 21	0 1	
St. John's	30 03 30 30 29 71	0 84	58 9	0 1 29 78 2	17	31 3	25 6 43 2	.....	6 5	3 13 6 3 12 10 15 6 4	.....	80	11	1 43	-1 71	6 21	0 1	
St. John's	30 03 30 30 29 71	0 84	58 9	0 1 29 78 2	17	31 3	25 6 43 2	.....	6 5	3 13 6 3 12 10 15 6 4	.....							

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P. E. ISLAND :										
Kilmahnaig .....	58.7	2.4	14	87.3	14	32.5	28	21.6	30.1	0.68
Georgetown .....	59.8	1.7	8.5	4	39	35.5	3	20.2	21.0	0.41
Charlotteown .....	58.3	1.0	17.7	9.4	14	39.2	3	16.2	25.3	0.47
.....	30.12	30.36	29.79	0.57						
.....	30.12	30.29	29.87	0.42						
BATHURST COLUMBIA :										
Oranienburg .....	57.0	1.1	28.0	0	5	42.7	17	15.0	22.1	48.7
Quamapan .....	54.3	3.7	5.8	0	5	36.0	18	27.2	51.0	
Barkerville .....	55.8	4.2	5.7	0	5	33.0	13	21.2	36.0	
Arassiz .....	55.0	3.4	3.0	0	5	33.0	3	17.2	37.0	
Spence's Bridge .....	59.7	7.3	4.1	5	41.0	18	28.1	28.0	6	4
Abbotsford .....	55.9	3.1	4.8	0	5	38.0	1	16.9	28.5	
Kerensons .....	59.2	1.1	1.80	0	22	40.0	10	12.6	32.0	
Fort Simpson .....	58.0	1.9	6.5	0	30	48.0	12	16.8	37.0	
Fort York .....	58.0	1.9	6.5	0	30	48.0	12	16.8	37.0	
Vernon .....	55.6	3.2	26.6	0	34.0	33.0	3	26.6	43.0	
Donald .....	51.8	4.7	1.50	0	6	29.0	19	27.4	50.0	
Quesselle .....	53.5	—	8.5	5	34.0	4	21.9	42.5		
Chiloutin .....	53.3	—	87.0	6	34.0	12	24.7	46.0		
Haylenore .....	56.9	—	89.0	5	37.0	3	18.5	41.0		
Griffin Lake .....	52.3	8.4	1.72	0	32.0	12	21.1	32.0		
Glacier .....	54.5	—	83.0	6	32.0	9	17.0	36.0		
Fort Steele .....	54.3	—	88.0	5	29.0	11	33.4	51.0		
Loch Erub .....	55.6	—	86.0	5	42.0	3	16.2	37.0		
Kaalaing .....	54.5	5.7	79.5	5	37.0	17	17.5	36.0		

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Locality	29-39-30	29-39-31	29-39-32	29-39-33	29-39-34	29-39-35	29-39-36	29-39-37	29-39-38	29-39-39	29-39-40	29-39-41	29-39-42	29-39-43	29-39-44	29-39-45	29-39-46	29-39-47	29-39-48	29-39-49	29-39-50	29-39-51	29-39-52	29-39-53	29-39-54	29-39-55	29-39-56	29-39-57	29-39-58	29-39-59	29-39-60	29-39-61	29-39-62	29-39-63	29-39-64	29-39-65	29-39-66	29-39-67	29-39-68	29-39-69	29-39-70	29-39-71	29-39-72	29-39-73	29-39-74	29-39-75	29-39-76	29-39-77	29-39-78	29-39-79	29-39-80	29-39-81	29-39-82	29-39-83	29-39-84	29-39-85	29-39-86	29-39-87	29-39-88	29-39-89	29-39-90	29-39-91	29-39-92	29-39-93	29-39-94	29-39-95	29-39-96	29-39-97	29-39-98	29-39-99	29-40-00	29-40-01	29-40-02	29-40-03	29-40-04	29-40-05	29-40-06	29-40-07	29-40-08	29-40-09	29-40-10	29-40-11	29-40-12	29-40-13	29-40-14	29-40-15	29-40-16	29-40-17	29-40-18	29-40-19	29-40-20	29-40-21	29-40-22	29-40-23	29-40-24	29-40-25	29-40-26	29-40-27	29-40-28	29-40-29	29-40-30	29-40-31	29-40-32	29-40-33	29-40-34	29-40-35	29-40-36	29-40-37	29-40-38	29-40-39	29-40-40	29-40-41	29-40-42	29-40-43	29-40-44	29-40-45	29-40-46	29-40-47	29-40-48	29-40-49	29-40-50	29-40-51	29-40-52	29-40-53	29-40-54	29-40-55	29-40-56	29-40-57	29-40-58	29-40-59	29-40-60	29-40-61	29-40-62	29-40-63	29-40-64	29-40-65	29-40-66	29-40-67	29-40-68	29-40-69	29-40-70	29-40-71	29-40-72	29-40-73	29-40-74	29-40-75	29-40-76	29-40-77	29-40-78	29-40-79	29-40-80	29-40-81	29-40-82	29-40-83	29-40-84	29-40-85	29-40-86	29-40-87	29-40-88	29-40-89	29-40-90	29-40-91	29-40-92	29-40-93	29-40-94	29-40-95	29-40-96	29-40-97	29-40-98	29-40-99	29-41-00	29-41-01	29-41-02	29-41-03	29-41-04	29-41-05	29-41-06	29-41-07	29-41-08	29-41-09	29-41-10	29-41-11	29-41-12	29-41-13	29-41-14	29-41-15	29-41-16	29-41-17	29-41-18	29-41-19	29-41-20	29-41-21	29-41-22	29-41-23	29-41-24	29-41-25	29-41-26	29-41-27	29-41-28	29-41-29	29-41-30	29-41-31	29-41-32	29-41-33	29-41-34	29-41-35	29-41-36	29-41-37	29-41-38	29-41-39	29-41-40	29-41-41	29-41-42	29-41-43	29-41-44	29-41-45	29-41-46	29-41-47	29-41-48	29-41-49	29-41-50	29-41-51	29-41-52	29-41-53	29-41-54	29-41-55	29-41-56	29-41-57	29-41-58	29-41-59	29-41-60	29-41-61	29-41-62	29-41-63	29-41-64	29-41-65	29-41-66	29-41-67	29-41-68	29-41-69	29-41-70	29-41-71	29-41-72	29-41-73	29-41-74	29-41-75	29-41-76	29-41-77	29-41-78	29-41-79	29-41-80	29-41-81	29-41-82	29-41-83	29-41-84	29-41-85	29-41-86	29-41-87	29-41-88	29-41-89	29-41-90	29-41-91	29-41-92	29-41-93	29-41-94	29-41-95	29-41-96	29-41-97	29-41-98	29-41-99	29-42-00	29-42-01	29-42-02	29-42-03	29-42-04	29-42-05	29-42-06	29-42-07	29-42-08	29-42-09	29-42-10	29-42-11	29-42-12	29-42-13	29-42-14	29-42-15	29-42-16	29-42-17	29-42-18	29-42-19	29-42-20	29-42-21	29-42-22	29-42-23	29-42-24	29-42-25	29-42-26	29-42-27	29-42-28	29-42-29	29-42-30	29-42-31	29-42-32	29-42-33	29-42-34	29-42-35	29-42-36	29-42-37	29-42-38	29-42-39	29-42-40	29-42-41	29-42-42	29-42-
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Location	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39	2039-40	2040-41	2041-42	2042-43	2043-44	2044-45	2045-46	2046-47	2047-48	2048-49	2049-50	2050-51	2051-52	2052-53	2053-54	2054-55	2055-56	2056-57	2057-58	2058-59	2059-60	2060-61	2061-62	2062-63	2063-64	2064-65	2065-66	2066-67	2067-68	2068-69	2069-70	2070-71	2071-72	2072-73	2073-74	2074-75	2075-76	2076-77	2077-78	2078-79	2079-80	2080-81	2081-82	2082-83	2083-84	2084-85	2085-86	2086-87	2087-88	2088-89	2089-90	2090-91	2091-92	2092-93	2093-94	2094-95	2095-96	2096-97	2097-98	2098-99	2099-00	2100-01	2101-02	2102-03	2103-04	2104-05	2105-06	2106-07	2107-08	2108-09	2109-10	2110-11	2111-12	2112-13	2113-14	2114-15	2115-16	2116-17	2117-18	2118-19	2119-20	2120-21	2121-22	2122-23	2123-24	2124-25	2125-26	2126-27	2127-28	2128-29	2129-30	2130-31	2131-32	2132-33	2133-34	2134-35	2135-36	2136-37	2137-38	2138-39	2139-40	2140-41	2141-42	2142-43	2143-44	2144-45	2145-46	2146-47	2147-48	2148-49	2149-50	2150-51	2151-52	2152-53	2153-54	2154-55	2155-56	2156-57	2157-58	2158-59	2159-60	2160-61	2161-62	2162-63	2163-64	2164-65	2165-66	2166-67	2167-68	2168-69	2169-70	2170-71	2171-72	2172-73	2173-74	2174-75	2175-76	2176-77	2177-78	2178-79	2179-80	2180-81	2181-82	2182-83	2183-84	2184-85	2185-86	2186-87	2187-88	2188-89	2189-90	2190-91	2191-92	2192-93	2193-94	2194-95	2195-96	2196-97	2197-98	2198-99	2199-00	2200-01	2201-02	2202-03	2203-04	2204-05	2205-06	2206-07	2207-08	2208-09	2209-10	2210-11	2211-12	2212-13	2213-14	2214-15	2215-16	2216-17	2217-18	2218-19	2219-20	2220-21	2221-22	2222-23	2223-24	2224-25	2225-26	2226-27	2227-28	2228-29	2229-30	2230-31	2231-32	2232-33	2233-34	2234-35	2235-36	2236-37	2237-38	2238-39	2239-40	2240-41	2241-42	2242-43	2243-44	2244-45	2245-46	2246-47	2247-48	2248-49	2249-50	2250-51	2251-52	2252-53	2253-54	2254-55	2255-56	2256-57	2257-58	2258-59	2259-60	2260-61	2261-62	2262-63	2263-64	2264-65	2265-66	2266-67	2267-68	2268-69	2269-70	2270-71	2271-72	2272-73	2273-74	2274-75	2275-76</
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Station	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990	1000																																																																																																																																																																																																																																																																									
Abbotsford	50.2	50.1	50.0	49.9	49.8	49.7	49.6	49.5	49.4	49.3	49.2	49.1	49.0	48.9	48.8	48.7	48.6	48.5	48.4	48.3	48.2	48.1	48.0	47.9	47.8	47.7	47.6	47.5	47.4	47.3	47.2	47.1	47.0	46.9	46.8	46.7	46.6	46.5	46.4	46.3	46.2	46.1	46.0	45.9	45.8	45.7	45.6	45.5	45.4	45.3	45.2	45.1	45.0	44.9	44.8	44.7	44.6	44.5	44.4	44.3	44.2	44.1	44.0	43.9	43.8	43.7	43.6	43.5	43.4	43.3	43.2	43.1	43.0	42.9	42.8	42.7	42.6	42.5	42.4	42.3	42.2	42.1	42.0	41.9	41.8	41.7	41.6	41.5	41.4	41.3	41.2	41.1	41.0	40.9	40.8	40.7	40.6	40.5	40.4	40.3	40.2	40.1	40.0	39.9	39.8	39.7	39.6	39.5	39.4	39.3	39.2	39.1	39.0	38.9	38.8	38.7	38.6	38.5	38.4	38.3	38.2	38.1	38.0	37.9	37.8	37.7	37.6	37.5	37.4	37.3	37.2	37.1	37.0	36.9	36.8	36.7	36.6	36.5	36.4	36.3	36.2	36.1	36.0	35.9	35.8	35.7	35.6	35.5	35.4	35.3	35.2	35.1	35.0	34.9	34.8	34.7	34.6	34.5	34.4	34.3	34.2	34.1	34.0	33.9	33.8	33.7	33.6	33.5	33.4	33.3	33.2	33.1	33.0	32.9	32.8	32.7	32.6	32.5	32.4	32.3	32.2	32.1	32.0	31.9	31.8	31.7	31.6	31.5	31.4	31.3	31.2	31.1	31.0	30.9	30.8	30.7	30.6	30.5	30.4	30.3	30.2	30.1	30.0	29.9	29.8	29.7	29.6	29.5	29.4	29.3	29.2	29.1	29.0	28.9	28.8	28.7	28.6	28.5	28.4	28.3	28.2	28.1	28.0	27.9	27.8	27.7	27.6	27.5	27.4	27.3	27.2	27.1	27.0	26.9	26.8	26.7	26.6	26.5	26.4	26.3	26.2	26.1	26.0	25.9	25.8	25.7	25.6	25.5	25.4	25.3	25.2	25.1	25.0	24.9	24.8	24.7	24.6	24.5	24.4	24.3	24.2	24.1	24.0	23.9	23.8	23.7	23.6	23.5	23.4	23.3	23.2	23.1	23.0	22.9	22.8	22.7	22.6	22.5	22.4	22.3	22.2	22.1	22.0	21.9	21.8	21.7	21.6	21.5	21.4	21.3	21.2	21.1	21.0	20.9	20.8	20.7	20.6	20.5	20.4	20.3	20.2	20.1	20.0	19.9	19.8	19.7	19.6	19.5	19.4	19.3	19.2	19.1	19.0	18.9	18.8	18.7	18.6	18.5	18.4	18.3	18.2	18.1	18.0	17.9	17.8	17.7	17.6	17.5	17.4	17.3	17.2	17.1	17.0	16.9	16.8	16.7	16.6	16.5	16.4	16.3	16.2	16.1	16.0	15.9	15.8	15.7	15.6	15.5	15.4	15.3	15.2	15.1	15.0	14.9	14.8	14.7	14.6	14.5	14.4	14.3	14.2	14.1	14.0	13.

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Salmon Atm.	44.0	-83.0	6	35.0	17	24.6441	3.80	-10.20	0.0
Glycer	47.0	-	0	29.0	18	29.3367	3.02	25.5	0.0
Fort Steele	54.3	-88.0	5	29.9	11	33.4510	1.15	14.16	0.0
Loch Ennoch	35.6	-86.5	5	42.0	3	16.2337	4.04	16.11	0.0
Nasauino	54.5	-57.7	5	57.6	17	17.5370	2.96	2.52	14.0

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2
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## PRECIPITATION.

The rain during the month of June was in Quebec and the Maritime Provinces much below the average; in the other parts of the Dominion it was in excess.

*The General Distribution is as follows :—*

In BRITISH COLUMBIA the rainfall was in general 2·77 in., or about 1·49 above the average.

In the NORTH-WEST TERRITORIES, 1·82 in., about 1·00 in. below the average.

In MANITOBA the rainfall was 4·09 in., or 0·53 in. above the average.

In ONTARIO, West and South-west District it was 2·91 in., or 0·08 in. above the average. In the North and North-west District it was 3·34 in., or 0·74 in. above the average. In the Central District it was 3·06 in., or 0·62 in. above the average. And in the East and North-east District it was 3·28 in., or 1·00 in. above the average.

In QUEBEC it was 2·62 in., or 0·44 in. below the average.

In NEW BRUNSWICK it was 1·51 in., or 1·95 in. below the average.

In NOVA SCOTIA it was 1·65 in., or 1·50 in. below the average.

In PRINCE EDWARD ISLAND it was 0·52 in. or 1·32 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA—Barkerville, 5·27 in.; Agassiz, 5·42 in.; Port Simpson, 6·03 in.

MANITOBA—Portage La Prairie, 5·57 in.; Treherne, 5·95 in.; Rosebank, 7·43 in.; Cartwright, 5·32 in.; Rathwell, 5·62 in.; Pembina Crossing, 7·11 in.; Morden, 7·51 in.; Carman, 6·89 in.

ONTARIO—Denbigh, 5·39 in.; Durham, 5·47 in.; Gravenhurst, 5·42 in.; Rockliffe, 5·25 in.; St. Mary's, 5·23 in.; Elora, 5·57 in.; Sault St. Marie, 8·39 in.; Haliburton, 5·05 in.; Beatrice, 7·02 in.

QUEBEC—Richmond, 5·40 in.

BERMUDA—8·33.

*Rainfall 1 inch and upwards in 24 hours :—*

1. Sault St. Marie, 2·00 in.; Bermuda, 3·46 in.

2. Rathwell, 1·24 in.; Greenwood, 1·05 in.; Hillyview, 1·37 in.; Morden, 1·33 in.; Greta, 1·05 in.; Posen, 1·06 in.; Carmen, 1·23 in.; Portage La Prairie, 2·06 in.; Elkhorn, 1·44 in.; Hillyview, 1·37 in.; Posen, 1·06 in.; Sault St. Marie, 4·00 in.; Sprucedale, 1·12 in.; Novar, 1·03 in.; Cayuga, 1·90 in.; Huntsville, 1·55 in.

3. Fort Ellice, 2·30 in.; Glen Adelaide, 1·35 in.; Channel Island, 1·38 in.; Beatrice, 2·05 in.; Whiteside, 1·26 in.; St. Mary's, 1·28 in.; Cartier, 1·30 in.; Elora, 1·25 in.; Fergus, 1·45 in.

4. Roseberry, 1·02 in.; Pelce Island, 1·00 in.; Quebec, 1·55 in.; Rockliffe, 1·40 in.; Alexandria, 1·39 in.; Montreal, 1·35 in.

5. Foxton, 2·44 in.; Haliburton, 1·15 in.; Port Hastings, 2·00 in.; Elora, 1·11 in.; St. George, 1·37 in.; Point Clark, 1·12 in.; Richmond, 1·70 in.; Digby, 1·00 in.

7. Chicoutimi, 1·63 in.; Edmonton, 1·06 in.

8. Heron Bay, 1·10 in.; Savanne, 2·10 in.; Fort Francis, 2·27 in.; White River, 1·07 in.; Bermuda, 1·95 in.; Fort Simpson, 1·50 in.

9. Agassiz, 1·02 in.; Schreiber, 1·10 in.; Fort Simpson, 1·20 in.

10. Quamichan, 1·02 in.; Agassiz, 1·49 in.; Loch Erroch, 1·02 in.; Channel, N. F. L., 1·10 in.; Georgina, 1·03 in.; Watford, 1·00 in.; Yarmouth, 1·15 in.

11. Niagara Falls, S., 1·11 in.; St. Mary's, 1·55 in.; Cottam, 1·45 in.; Stratford, 1·37 in.; Gravenhurst, 1·29 in.; Barrie, 1·07 in.; Egremont, 1·35 in.; Richmond, 1·35 in.; Sunshine, 2·01 in.; Wyoming, 1·20 in.; Aurora, 1·09 in.; Coldstream, 1·06 in.; Sarnia, 1·42 in.; Mount Forest, 1·75 in.

12. Channel Island, 1·03 in.

13. Battleford, 1·30 in.

14. Cartwright, 1·21 in.; Battleford, 2·22 in.; Medicine Hat, 1·10 in.

15. Norquay, 1·00 in.; Midland, 1·30 in.

16. Minden, 1·12 in.; Collingwood, 1·01 in.

17. Lucknow, 1·21 in.; Cayuga, 1·02 in.

18. Digby, 1·00 in.

19. Fergus, 1·48 in.

20. St. John, N.F.L., 2·22 in.

21. Elora, 1'06 in.; Conestogo, 1'00 in.; Georgetown, 1'03 in.; Aurora, 1'00 in.; Thedford, 1'07 in.; Wilton Grove, 1'00 in.; Presque Isle, 1'20 in.; Port Arthur, 1'33 in.
22. Paris, 1'33 in.; Heron Bay, 1'10 in.; White River, 1'17 in.
23. Channel Island, 1'75 in.; Richmond, 1'08 in.; Qu'Appelle, 1'73 in.
24. Digby, 1'00 in.
25. Cartwright, 1'70 in. (*less than 1 hour*); Clontarf, 1'20 in.; Rockliffe, 1'16 in.; Kingston, 1'38 in.
26. Gravenhurst, 1'77 in.; Bermuda, 1'25 in.
27. Mattawa, 1'50 in.; Beatrice, 1'56 in.; Burk's Falls, 1'50 in.; Bermuda, 1'00 in.
28. Oakbank, 1'62 in.; Treherne, 2'50 in.; Rosebank, 3'99 in.; Cartwright, 1'45 in.; Rathwell, 2'66 in.; Greenwood, 1'00 in.; Pembina Crossing, 3'71 in.; Morden, 4'34 in.; Gretna, 1'47 in.; Selkirk, 1'32 in.; Roseberry, 1'00 in.; Carmen, 3'76 in.; Cartwright (2), 2'23 in.; Saskatoon, 1'20 in.; Portage La Prairie, 1'50 in.; Oakbank, 1'62 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Savanne, Father Point, IV.
2. Princeton, B.C., *brilliant*.
3. Pembina Crossing, IV; Savanne Channel, Nfld., II.
5. Pembina Crossing, IV.
6. Hillview, Elora, Durham, IV.
7. Elora, Minnedosa, IV.
8. Elora, White River, IV.
9. Savanne Channel, Island, IV; Quebec, III; Swift Current, II; Alexandria, III.
10. Point Escuminac, Savanne, Elkhorn, II; Port Arthur, III.
11. Port Arthur, IV; White River, IV.
12. White River, III.
13. St. Albans, IV; Princeton, B.C., Quebec, IV.
14. Chicoutimi, Quebec, IV; Alexandria, III.
15. St. Albans, II; Hillview, Cape Chatte, Port Arthur, III; Quebec, IV; Alexandria, II.
17. Quebec, IV.
18. St. Albans, III; Pembina Crossing, IV; Calvin, I; Quebec, IV; Alexandria, II; Toronto, IV; Father Point, III.
19. Novar.
23. Montreal, IV.
26. Gravenhurst, IV; Savanne.
27. Savanne.
28. Point Escuminac.
29. Novar, IV; Barrie, III; Calvin, I; Quebec, IV; Father Point, III.
30. Quebec, IV.

*Thunder recorded on:*

1. Roseberry, Norquay, Pelee Island, Georgina, Stratford, Orillia, Cottam, Lucknow, Montreal.
2. Rosebank, Pembina Crossing, Roseberry, Georgetown, Scarboro, Mount Forest, Thompson, Burk's Falls, Pelee Island, Bancroft, Novar, Egremont, Gravenhurst, Welland, Uplands, Bognor, Haliburton, Fort Francis, Orillia, Peterboro', Posen, Emerson, Durham, Toronto, Clontarf, Sprucedale, Whiteside, Owen Sound, Beatrice, Norwood, Niagara Falls, S.
3. Selkirk, Georgetown, Aurora, Thedford, Mount Forest, Blenheim, Cowal, Burk's Falls, Point Clark, Egremont, Chatham, Welland, Stratford, Ridgetown, Bognor, Shannonville, Cottam, St. Mary's, Paris, Coldwater, Durham, Alexandria, London, Toronto, Montreal, Deseronto.
4. Roseberry, Georgetown, Scarboro', Pelee Island, Brome, Glenbow, Durham, Alexandria, Toronto, Montreal.
5. Aurora, Pelee Island, Bancroft, Egremont, Barrie, Minden, Oak Bank, Alexandria, Lindsay.
6. Roseberry, Keremeos, Griffin Lake, Cayuga.
7. St. Albans, Savanne, Banff, Posen, Elkhorn, Winnipeg.

8. Treherne, Rosebank, Cartwright, Rathwell, Pembina Crossing, Norquay, Fort Francis, Emerson, Glenbow, Brandon, Swift Current.

9. Georgetown, Burk's Falls, Novar, Gravenhurst, Uplands, Fort Francis, Peterboro', Sprucedale, Whiteside, Beatrice.

10. St. Albans, Loch Erroch, Hazlemere, Georgetown, Aurora, Thedford, Cayuga, Huntsville, Cowal, Pelee Island, Egremont, Welland, Georgina, Stratford, Cottam, Lucknow, Paris, Saskatoon, Durham, London, Toronto.

11. Wyoming, Scarboro', Princeton, Huntsville, Richmond, Elora, Parker's Ridge, St. Mary's, Posen, Channel Island, Fredericton, Montreal, Deseronto.

12. Posen, Fredericton.

13. Pembina Crossing, Pelee Island, Portage La Prairie, Henrietta.

14. St. Albans, Pilot Mound, Treherne, Pembina Crossing, Morden, Selkirk, Roseberry, Norquay, Oakbank, Posen, Emerson, Glenbow.

15. St. Albans, Hillview, Norquay, Aurora, Wiarton, Cayuga, Huntsville, Midland, Burk's Falls, Pelee Island, Bancroft, Calvin, Novar, Barrie, Gravenhurst, Georgina, Uplands, Cartier, Bognor, Haliburton, Fort Francis, Lakefield, Cottam, Hillview, Portage La Prairie, Lindsay, Peterborough, Lucknow, Sprucedale, Whiteside, Owen Sound, Beatrice, Posen.

16. St. Albans, Pembina Crossing, Nicola Lake, Georgetown, Wyoming, Thedford, Dealtown, Blenheim, Cayuga, Huntsville, Orangeville, Cowal, Thompson, Midland, Burk's Falls, Bancroft, Calvin, Point Clark, Egremont, Gravenhurst, Welland, Georgina, Stratford, Upland, Bognor, Haliburton, Cottam, St. Mary's, Lucknow, Sprucedale, Whiteside, Port Rowan, Minden, Beatrice, Norwood, Durham, London, Lindsay.

17. Belmont, Georgetown, Cayuga, Bancroft, Clontarf, Whiteside, Paris, Swift Current.

18. Rathwell, Fort Ellice, Hillview, Roseberry, Pictou, Digby, Point Lepreaux, Parker's Ridge, Point Escuminac, Fort Francis, Savanne, Oakbank, Posen, Hillview, Elkhorn, Fort Ellice, Swift Current, Winnipeg, Fredericton, Alexandria, Montreal, Bathurst.

19. Treherne, Belmont, Fort Ellice, Pembina Crossing, Selkirk, Pictou, Richmond, Brome, Posen, Glenbow, Saskatoon, Fort Ellice, Truro, Montreal.

20. Pembina Crossing, Pelee Island, Novar, Egremont, Fort Frances, Glenbow.

21. Roseberry, Georgetown, Aurora, Thedford, Scarboro', Coldstream, Mount Forest, Cayuga, Princeton, Bancroft, Egremont, Georgina, Uplands, Bognor, Lakefield, Cottam, Clontarf, Owen Sound, Paris, Port Arthur, Coldwater, Toronto.

22. Mount Forest, Huntsville, Burk's Falls, Bancroft, Calvin, Stony Creek, Gravenhurst, Cartier, Haliburton, Lakefield, Peterboro', Clontarf, Norwood, Portage La Prairie, Lindsay.

23. Treherne, Rosebank, Pembina Crossing, Lakefield, Niagara Falls S., Posen, Portage La Prairie, Fort Ellice.

24. Norquay, Lion's Head, Georgetown, Wiarton, Cowal, Thompson, Midland, Burk's Falls, Egremont, Welland, Bognor, Lakefield, Lucknow, Owen Sound, Posen, Durham, Toronto.

25. Georgetown, Aurora, Scarboro', Coldstream, Blenheim, Cayuga, Bancroft, Egremont, Barrie, Gravenhurst, Uplands, Cartier, Bognor, Haliburton, Lakefield, St. Mary's, Clontarf, Sprucedale, Whiteside, Minden, Beatrice, Norwood, Paris, Oakbank, Coldwater, Lindsay, Toronto, Deseronto.

26. St. Albans, Treherne, Cartwright (*vi lent*), Rathwell, Hillview, Pembina Crossing, Pelee Island, Bancroft, Calvin, Welland, Uplands, Haliburton, Lakefield, St. Mary's, Clontarf, Whiteside, Minden, Beatrice, Norwood, Oakbank, Posen, Channel Island, Hillview, Portage la Prairie, Saskatoon, Coldwater, Lindsay, Montreal.

27. Roseberry, Norquay, Georgetown, Mount Forest, Burk's Falls, Bancroft, Calvin, Point Clark, Barrie, Uplands, Bognor, Haliburton, St. Mary's, Lucknow, Sprucedale, Whiteside, Beatrice, Oakbank, Durham.

28. Rosebank, Pembina Crossing, Selkirk, Wyoming, Midland, Pelee Island, Calvin, Point Clark, Bognor, Cottam, St. Mary's, Lucknow, Owen Sound, Oakbank, Posen, Channel Island, Glenbow, Portage La Prairie, Glen Adelaide, Durham, London.

29. Norquay, Egremont, Fort Frances, Savanne, Banff, Glenbow, Glen Adelaide, Durham, London.

30. Rathwell, Pembina Crossing, Mount Forest, Bancroft, Richmond, Oakbank, Portage La Prairie, Saskatoon, Fredericton.



*Frost noted on :*

BRITISH COLUMBIA—Salmon Arm, 11th; Glacier, *snow*, 15th; Fort Steele, 11th; Fort Steele, 17th and 18th.

NORTH-WEST TERRITORIES—Glenbow, 1st, 5th, 12th, 16th, 19th; Banff, 3rd, 5th, 11th, *snore*, 15th, *snore*, 18th, *snore*, 19th, 28th; Oonikup, 17th; Saskatoon, 2nd, 4th, 24th.

ONTARIO—Scarborough, 7th; Savanne, 10th.

QUEBEC—Chicoutimi, 1st.

PRINCE EDWARD ISLAND—Kilmahumaig, 28th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF JUNE, 1863.

HOURS ENDING																
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....	..	0 06	0 13	0 30	0 46	0 46	0 47	0 55	0 06	0 06	0 00	0 03	0 56	70 49	0 29	..
AGASSIZ, B.C.....	..	06	17	25	35	39	43	44	47	43	49	43	24	15	04	..
BRANDON.....	..	07	21	37	51	54	57	58	01	05	37	56	59	56	46	0 02
INDIAN HEAD.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
WINNIPEG.....	06	36	42	43	47	50	51	57	60	03	00	04	00	56	48	10
WOODSTOCK.....	..	09	17	55	61	69	65	66	69	60	55	42	39	25	07	..
TORONTO.....	..	23	54	58	63	65	69	74	73	68	65	60	70	56	31	..
LINDSAY.....	11	45	51	56	57	59	66	70	75	70	68	71	62	55	45	35
BARRIE.....	S.	36	61	60	68	69	72	69	67	70	69	65	63	54	38	..
KINGSTON.....	..	28	49	55	57	70	67	74	70	80	76	72	66	57	52	04
MONTREAL.....	..	23	39	49	47	54	56	59	64	64	66	58	54	49	03	..
FREDERICTON.....	04	39	48	48	56	61	60	64	66	71	71	69	63	49	43	13

	ESQUIMAULT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshiner being 1.)	0.39	0.28	0.42	..	0.46	0.43	0.54	0.57	0.56	0.56	0.50	0.53
MAXIMUM DAILY AMOUNT.....	0.83	0.84	0.88	..	0.89	0.88	0.81	0.97	0.88	0.90	0.96	0.94
DATE.....	3	4	6	..	16	12	7-23	18-20	8	7	30	8
NO. OF DAYS COMPLETELY CLOUDED.....	4	4	5	..	4	1	0	0	0	0	5	4

## PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 583. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA .....	89	61	15	13	77 0
LOWER LAKE REGION.....	109	87	16	6	87 2
UPPER ST. LAWRENCE .....	101	77	18	6	85 1
LOWER ST. LAWRENCE.....	97	69	11	17	76 8
GULF.....	94	65	12	17	75 0
MARITIME PROVINCES .....	93	68	15	10	81 2
TOTAL.....	583	427	87	69	80 7

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents' at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer H. V. Payne.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR JUNE, 1893.

The first two days were generally free from disturbance. On the night of the 3rd a slight disturbance began and continued to the 7th. A marked increase of the vertical component took place on the afternoon of the 4th. After 4.20 p.m. a steady recovery set in, and at 8 p.m. the needle was at its normal reading. The h. f. curve was a little more wavy, an increase being also shewn during the afternoon. The 8th was a particularly quiet day. On the morning of the 9th a small disturbance sprang up; during the night hours it became more marked. The westerly movements of the declination needle were the largest. After midnight the needles quieted down. Slow waves of disturbance were noticed during the evening on the horizontal force curve. The magnets on the nights of the 10th and 11th were a little unsteady. Slight disturbing action appeared on the morning of the 14th, and was visible up to the following morning. The next three days were very quiet. After 7 a.m. of the 18th the magnets became unsteady, and a moderate disturbance was recorded on the 18th and 19th. There is a marked resemblance in the movements of the declination needle on the nights of the 18th and 19th. During the former night the movements were much larger. The most important movement was a westerly change of 40' of declination at 11.13 p.m. The force magnets were not much affected. Slight disturbance prevailed on the 20th, and after 6 a.m. of this day the magnets quieted down and a steady easterly movement of the declination needle began, followed at noon by a marked westerly increase up to 4 p.m. Slight irregularities were shown on the evening of the 22nd and 27th, and all day of the 28th. On the 29th the movements increased; a few rapid movements of the declination magnet were recorded between 5 and 7 p.m. This disturbance continued to the end of the month. On the morning of the 30th the magnets showed a tendency to quiet down, but during the night hours the disturbance became more active. A steady decrease of the vertical force was shown on the morning of the 29th, lasting up to 2 p.m., after which an increase set in. From 2 to 8 p.m. of this day the horizontal component was changing rapidly. There were, however, no large departures from the normal.

On the 18th there was a formation of cumulus and haze in North all day, which was similar to auroral arch. During the night faint auroral light was observed.

On the 4th, 6th, 7th, 8th, 9th, 11th, 12th, 13th, 14th, 15th, 17th, 19th, 20th, 21st, 22nd, 23rd, 28th, 29th and 30th the sky was clear. On all other nights, clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, October 3rd, 1893.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

JULY, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The area of mean atmospheric pressure of greatest departure below normal — 0.80 inches lay over Cape Breton, but as a rule pressure was very near to or at its average throughout by far the greater portion of the continent. Temperature was also everywhere extremely close to its normal and nowhere did it exceed it either one way or the other more than a degree or two. Eight low pressure areas were charted during the month and no less than seven of these passed from the north-western Rocky mountain slope north of the Lake Region and thence over the lower St. Lawrence Valley and the Gulf, the average rate of movement was 25½ miles per hour.

1st. 8th. The distribution of pressure over Canada during this period was almost entirely cyclonic, several shallow depressions following one another in quick succession across the country chiefly from British Columbia and the North-west Territories and thence down the St. Lawrence Valley. The weather as a sequence was often disturbed and showery and during the interval heavy thunder-storms were pretty well distributed over all districts. High southerly to westerly winds were experienced on the 8th, in the St. Lawrence Valley and the Gulf, but as a rule the winds were everywhere light or moderate. Temperature was on the whole well up to or above its average, along the St. Lawrence it was higher than elsewhere, and maxima between 80° and 90° were almost daily recorded.

By the morning of the 9th higher pressure had set in over the greater portion of Canada, and the weather was fine and pleasant. The same night, however, showers and thunder-storms again occurred over British Columbia and the Rocky Mountain slope owing to the influence of another disturbance, and with its advance eastward next day, showers and severe thunder-storms extended into Manitoba. At Qu'Appelle 2.30 inches of rain fell, and at Winnipeg, 1.16 inches.

The disturbance heralded another interval of cyclonic conditions over Canada, a series of depressions, as a rule, of shallow dimensions making their presence felt by the showers and thunder-storms which attended them during their progress over the country. Early on the 12th the fine weather in Ontario gave way to showers and thunder-storms, and during the day they were reported very generally as far as our Atlantic Coast. The disturbed and showery weather lasted in the North-west until the night of the 16th, in the Lake Region until the following night, and in Eastern Canada until a day later. During the period although showers and thunder-storms were as before stated very generally experienced still there were many fair intervals in all localities, and the temperature was on the whole up to or above its average.

An interval of comparatively high pressure conditions now ensued over the greater portion of Canada, and for several days very fine weather everywhere prevailed.

On the night of the 20th a shallow depression caused some local showers or thunder storms in Manitoba, and on the 21st light scattered showers occurred in the Maritime Provinces.

A well marked depression which was centred on the 22nd morning in the Lower St. Lawrence Valley had either formed there during the night with great rapidity, or had travelled down from

the northward. It drew fresh to strong south-westerly to westerly winds over the country from the Lakes to the Atlantic between the 22nd and 23rd, and gave numerous showers and thunder-storms over Eastern Canada, and more locally as far west as the Lake Region. Again on the 24th scattered but light showers occurred in the Maritime Provinces.

Between the 22nd and 24th inclusive, owing to the influence of a shallow depression, showers and thunder-storms occurred in the North-west Territories and Manitoba. This depression as it passed over the Lake Region and down the St. Lawrence between the 25th and 27th, developed greater energy. Its accompanying showers and thunder-storms were generally experienced from the Lakes to the Atlantic, and afterwards owing to the immediate succession of high pressure in its wake, a fairly steep gradient for westerly and north-westerly winds was formed and as a consequence high winds were felt in all districts, attaining locally to the force of moderate gales.

A depression which was of some importance when in the North-west Territories and Manitoba, gave there, between the 26th and 27th, heavy showers and thunder-storms and high winds. Then with diminished energy it traversed the Lake Region and Eastern Canada, giving showers and thunder-storms between the 28th and 29th, more numerously in the Maritime Provinces than elsewhere.

Another shallow depression, and the last to pass over Canada during the month, gave some scattered showers and thunder-storms in the North-west on the 29th, and in the Lake Region and the St. Lawrence Valley on the 31st.

#### TEMPERATURE.

The average temperature differed little from the normal at each station.

*The Highest and Lowest Temperatures in each Province during July were :*

British Columbia, 98°·2 on 31st at Fort Steele : 32°·9 on 1st at Fort Steele.

North-west Territories, 100°·0 on 18th at Chaplin : 31°·9 on 25th at Banff.

Manitoba, 101°·5 on 20th at St. Albans : 32°·0 on the 26th at Fort Ellice.

Ontario, 98°·0 on 21st at Savanne : 98°·0 on 25th at Stony Creek : 30°·5 on 24th at Minden.

Quebec, 90°·6 on 2nd at Chicoutimi : 30°·0 on 1st at Cape Norman.

New Brunswick, 95°·0 on 1st at Dalhousie : 42°·0 on 10th at Parker's Ridge.

Nova Scotia, 85°·2 on 21st at Halifax : 41°·0 on 11th at Truro.

Prince Edward Island, 82°·9 on 1st at Kilmahumaig : 43°·2 on 8th at Kilmahumaig.







## PRECIPITATION.

The rainfall for the month has not differed much from the normal for each province, the excess in some districts being due to heavy falls attending local thunder-storms.

*The distribution is as follows :—*

In BRITISH COLUMBIA, it was 1'69 in., or 0'38 in. above the average.

In the NORTH-WEST TERRITORIES, it was 2'37 in., or 0'24 in. above 1892.

In MANITOBA, it was 2'99 in., or 0'07 in. above the average.

In ONTARIO, West and South-west District, it was 1'67 in., or 1'79 in. below the average. In the North and North-west District, it was 2'75 in., or 0'01 in. above the average. In the Central District it was 2'10 in., or 0'62 in. below the average, and in the East and North-east District it was 3'22 in., or 0'32 in. above the average.

In QUEBEC it was 3'96 in., or 0'26 in. below the average.

In NEW BRUNSWICK, it was 3'76 in., or 0'15 in. below the average.

In NOVA SCOTIA, it was 3'99 in., or 0'43 in. below the average.

In PRINCE EDWARD ISLAND, it was 3'37 in. or 0'57 in. below the average.

*Rai full 5 inches and upwards during month :—*

MANITOBA—Winnipeg, 5'42 in. ; Posen, 6'27 in. ; Foxton, 5'04 in.

ONTARIO—Sprucedale, 5'25 in. ; Ottawa, 5'67 in. ; Haliburton, 5'03 in. ; Clontarf, 5'23 in. ; Fort Francis, 5'08 in.

QUEBEC—Richmond, 5'01 in. ; Brome, 6'07 in.

NEW BRUNSWICK—Bathurst, 5'21 in. ; Parker's Ridge, 6'21 in.

NOVA SCOTIA—Sable Island, 7'63 in.

BERMUDA—5'12.

*Rainfall 1 inch and upwards in 24 hours :—*

1. Channel Island, 1'75 in. ; Norquay, 2'35 in. ; Winnipeg, 2'56 in.

2. Beatrice, 1'32 in.

3. Brome, 1'75 in. ; Haliburton, 1'10 in. ; Denbigh, 1'00 in. ; Ennismore, 1'48 in. ; Bancroft, 1'53 in.

4. Parker's Ridge, 1'60 in. ; Port Hastings, 1'20 in. ; Bathurst, 1'45 in. ; Fredericton, 1'20 in.

5. Whitehead, 1'62 in. ; Owen Sound, 1'40 in.

6. Pelee Island, 1'25 in. ; Parker's Ridge, 1'52 in.

7. Sable Island, 1'80 in. ; Roseberry, 1'02 in.

8. Clontarf, 1'43 in. ; Renfrew, 1'12 in.

11. Brandon, 1'00 in. ; Qu'Appelle, 2'30 in. ; Swift Current, 1'40 in. ; Edmonton, 1'11 in.

12. Shoal Lake, 1'21 in. ; Oak River, 1'28 in. ; Foxton, 1'30 in. ; Posen, 2'53 in. ; Medicine Hat, 1'23 in. ; Prince Albert, 1'36 in.

13. Saskatoon, 2'50 in. ; Watford, 1'12 in. ; Huntsville, 1'04 in. ; Cowal, 1'38 in.

14. Sable Island, 1'07 in. ; Renfrew, 1'61 in. ; Orangeville, 1'00 in.

15. Port Stanley, 1'51 in. ; St. John, 1'14 in.

16. Anticosti W.P., 1'57 in. ; Cape Chatte, 1'56 in. ; Port Simpson, 1'02 in.

17. Ottawa, 1'61 in. ; Alexandria, 1'25 in.

21. Chicoutimi, 1'20 in.

22. Clontarf, 1'10 in. ; Point des Monts, 1'10 in. ; Renfrew, 1'05 in.

24. Cape Magdalen, 1'25 in.

25. Burk's Falls, 1'15 in. ; Uplands, 1'40 in. ; Amour Point, 1'25 in. ; Bermuda, 1'55 in.

26. Richmond, 1'25 in. ; Brome, 2'14 in. ; Port Hastings, 1'00 in. ; Minden, 1'15 in. ; Bloomingdale, 1'04 in. ; Bancroft, 1'00 in.

27. Posen, 1'07 in. ; Fort Ellice, 1'02 in. ; Port Hastings, 1'30 in. ; Kilmahumag, 1'27 in. ; Stratford, 1'00 in. ; Shoal Lake, 1'06 in. ; Foxton, 2'00 in. ; Selkirk, 1'10 in. ; Gretna, 1'00 in. ; Rosbank, 1'50 in. ; Truro, 1'30 in. ; Bathurst, 1'50 in.

28. Carman, 1'01 in. ; Greenwood, 1'88 in.

*Thunder-storms recorded on :*

1. Pembina Crossing, Fort Ellice, Rapid City, Norquay, Treherne, Belmont, Rosbank, Fort Francis, Portage la Prairie, Emerson, Elora, Richmond, London, Durham.

2. Thedford, Cayuga, Huntsville, Georgetown, Cowal, Wiarton, Norquay, Paris, Lucknow, Stroud, Minden, Owen Sound, Sprucedale, Haliburton, White Side, Uplands, Pelee Island, Cottam,



Cartier, Bognor, Galt, Calvin, Beatrice, Barrie, Durham, Novar, Gravenhurst, Mount Forest, Burks Falls, Alton, Coldwater, Lindsay, Ottawa, Toronto, Bancroft, Thedford.

3. Lion's Head, Georgetown, Denbigh, Pembina Crossing, Turtle Mountain, Treherne, Lucknow, St. Mary's, Port Rowan, Henrietta, Glenbow, Sprucedale, Peterboro', Uplands, Clontarf, Niagara Falls, S.; Richmond, *terrific hail*  $\frac{1}{2}$  in diameter, Stony Creek, Coldwater, Durham, Ottawa, Qu'Appelle, Port Rowan, Toronto, Bancroft.

4. Wyoming, Denbigh, Pembina Crossing, Oak River, Paris, St. Albans, Glenbow, Emerson, Galt, Posen, Elora, Minnedosa.

5. Thedford, Midland, Cayuga, Lion's Head, Georgetown, Scarboro', Cowall, Wiarton, Roseberry, Barkeville, Norquay, Oakbank, Rosebank, Lucknow, Stratford, Port Rowan, Owen Sound, Welland, Peterboro', Bognor, Stony Creek, Coldwater, Lindsay, Durham, Qu'Appelle, Alexandria, Toronto, Bancroft, Thedford.

6. Wyoming, Wilton Grove, Georgetown, Glenbow, Glen Adelaide, Pelee Island.

7. Thedford, Midland, Lion's Head, Georgetown, Pembina Crossing, Roseberry, Oakbank, Rosebank, Lucknow, Georgina, Glenboro', Niagara Falls, S. Bognor, Digby, Burk's Falls, Sable Island, Dunham, Medicine Hat, Toronto, Thedford.

8. Thompson, Presqu'Isle, Wyoming, Midland, Huntsville, Georgetown, Scarboro, Denbigh, Stratford, St. Mary's Minden, Owen Sound, Sprucedale, Fort Francis, Elora, Durham, Ottawa, Medicine Hat, Toronto, Bancroft, Welland, Peterboro', Haliburton, Uplands, Parker's Ridge, Cartier, Bognor, Pictou, Galt, Calvin, Beatrice, Richmond, Egremont, Novar, Gravenhurst, Point Escuminac, Burks Falls, Alton, Chicoutimi, London, Coldwater, Lindsay.

9. Glenbow, Point Clark, Grand Manan, Medicine Hat, Calgary.

10. Pembina Crossing, Treherne, Bognor, Posen, Winnipeg, Swift Current.

11. Quamichan, Shoal Lake, *terrific storm*, Fort Ellice, Hillview, Rapid City, Oakbank, Georgina, St. Albans, Glenbow, Glen Adelaide, Elkhorn, Owen Sound, Fort Francis, Bognor, Portage la Prairie, Brandon, Posen, Channel N.F.L., Coldwater, Battleford, Winnipeg, Qu'Appelle, Swift Current, Prince Albert.

12. Presqu'Isle, Lion's Head, Georgetown, Scarboro, Oak River, Fort Ellice, *very severe*, Hillview, Oakbank, Lucknow, Georgina, St. Mary's, Port Rowan, Kilmahumag, Glenbow, Glen Adelaide, Elkhorn, Brantford, St. John N.B., Owen Sound, Welland, Pelee Island, Niagara Falls, S., Bognor, Portage la Prairie, Posen, Truro, Bathurst Wallace, Saugeen, Grand Manan, Qu'Appelle, Swift Current, Elora, Mount Forest, Lindsay, Durham, Truro, Calgary, Port Rowan, Toronto.

13. Thedford, Midland, Cayuga, Dealtown, Lion's Head, Wilton Grove, Blenheim, *severe*, Georgetown, Scarboro', Cowal, *terrific wind*, Lucknow, Stratford, Port Rowan, Ridgetown, Welland, Parker's Ridge, Cottam, Bognor, Point Clark, Galt, Elora, Alton, Stony Creek, London, *terrific wind*, Durham, Port Stanley, Saugeen, Grand Manan, Medicine Hat, Charlottetown, Fredericton, Port Rowan, Toronto, Thedford.

14. Midland, Sunshine, *very heavy storm*, Scarboro, Wiarton, Fort Ellice, Roseberry, Treherne, Belmont, Port Rowan, Glenbow, Fort Francis, Posen, Beatrice, Swift Current, Fredericton, Port Rowan.

15. Thompson, Presqu'Isle, Princeton, Thedford, Cayuga, Dealtown, Sunshine, Lion's Head, *terrible*, Wilton Grove, Georgetown, Scarboro, Cowal, Norquay, Treherne, Oakbank, Rosebank, Paris, Lucknow, Stratford, St. Mary's, Port Rowan, Ridgetown, Brantford, Owen Sound, Galt, Elora, Beatrice, Egremont, Gravenhurst, Burks Falls, Alton, Sprucedale, Fort Francis, Welland, Niagara Falls, S., Bognor, Point Clark, London, Coldwater, Lindsay, Durham, Port Stanley, Saugeen, Port Arthur, Parry Sound, Port Dover, Port Rowan, Toronto, Thedford.

16. Dealtown, Georgetown, Norquay, Lucknow, Port Rowan, Chicoutimi, Channel, N.F.L., Truro, Bathurst, Deseronto, Port Arthur, Fredericton, Port Rowan.

17. Glacier, Uplands, Clontarf, Pelee Island, Norwood, Richmond, Novar, Burk's Falls, Stony Creek, Deseronto, Ottawa, Alexandria, Toronto, Bancroft.

18. Georgetown, P. E. I., Kilmahumag, Glenbow, St. John, Uplands, Pictou, Burk's Falls, Bathurst, Ottawa, Fredericton, Bancroft.

19. Oakbank, Georgetown, P.E.I., Kilmahumag, Portage la Prairie, Brome, Pictou, Truro, Halifax, St. Andrew's.

20. Greenwood, *very heavy*, Roseberry, St. Albans, Elkhorn, Pictou, Brandon, Posen, Channel, Island, Chicoutimi, Truro, Minnedosa.

21. Glacier, Pembina Crossing, Georgetown, P.E.I., Uplands, Calvin, Richmond, Sable Island, Chicoutimi, Quebec, Medicine Hat, Charlottetown, Bancroft.

22. Dealtown, Lion's Head, Wilton Grove, Georgetown, Oakbank, Lucknow, St. Mary's, Port Rowan, Georgetown, P.E.I., Kilmahunaig, Ridgetown, Minden, Sprucedale, Uplands, Clontarf, Cartier, Bognor, Portage la Prairie, Brome, Norwood, Calvin, Egremont, Novar, Channel Island, Gravenhurst, Burk's Falls, Alton, Durham, Truro, Ottawa, Port Stanley, Quebec, Saugeen, White River, Port Dover, Charlottetown, Alexandria, Fredericton, Port Rowan, Bancroft.

23. Blenheim, *severe*, Pembina Crossing, Hilview, Rapid City, Selkirk, Oakbank, Georgetown, Elkhorn, Portage la Prairie, Pictou, Posen, Sable Island, Chicoutimi, Truro, St. John, N.F.L., Halifax, St. Andrew's, Yarmouth, Minnedosa.

24. Fort Ellice, Turtle Mountain, Roseberry, *heavy wind and hail*, Treherne, Oakbank, St. Albans, Pelee Island, Portage la Prairie, Emerson, Posen, Channel Island, Truro, Port Arthur.

25. Thompson, Thedford, Midland, Georgetown, Aurora, Scarboro, Pembina Crossing, Norquay, Ridgetown, Sprucedale, Fort Francis, Haliburton, Uplands, Clontarf, Niagara Falls, S. Cartier, Bognor, Posen, Calvin, Beatrice, Barrie, Novar, Gravenhurst, Burk's Falls, *heavy*, Sable Island, Lindsay, Alexandria, Toronto, Bancroft, Thedford.

26. Presqu'Isle, Princeton, Midland, Cayuga, Lion's Head, Georgetown, Wiarton, Pembina Crossing, Oakbank, Lucknow, St. Mary's, St. Albans, Elkhorn, Minden, Brantford, St. John, St. Andrew's, Port Dover, Toronto, Bancroft, Sprucedale, Welland, Peterboro', Haliburton, Whiteside, Uplands, Niagara Falls, S. Cartier, Portage la Prairie, Brome, Pictou, Point Lepreaux, Galt, Norwood, Posen, Calvin, Beatrice, Conestogo, Barrie, Richmond, Egremont, Novar, Truro, Gravenhurst, Mount Forest, Burk's Falls, Alton, Chicoutimi, London, Coldwater, Deseronto, Wallace, Ottawa, Port Stanley, Saugeen, Parry Sound, Grand Manan.

27. Shoal Lake, *terrible hail*, Fort Ellice, *terrific with hail*, Hilview, Norquay, Gretna, Oakbank, Kilmahunaig, Elkhorn, St. John, Parker's Ridge, Portage la Prairie, Emerson, Digby, Pictou, Point Lepreaux, Brandon, Posen, Point Escuminac, Burk's Falls, Sable Island, Truro, St. Andrew's, Yarmouth, Winnipeg, Qu'Appelle, Minnedosa.

28. Carmen, *severe*, Glen Adelaide, Uplands, Fredericton.

29. Keremeos, Turtle Mountain, Treherne, Owen Sound, Portage la Prairie, Posen, Renfrew.

30. Agassiz, Loch Erroch, Princeton, (B.C.) Hazelmere, (B.C.) Norquay, Sable Island, Spence's Bridge.

31. Princeton, Cayuga, Georgetown, Aurora, Scarboro, Barkerville, Paris, Lucknow, Georgina, Port Rowan, Henrietta, Brantford, Sprucedale, Welland, Peterboro', Whiteside, Uplands, Clontarf, Novar, Sable Island, Coldwater, Durham, Ottawa, Port Dover, Alexandria, Port Rowan, Toronto, Bancroft.

*Aurora recorded—*

*When the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Calvin, I.

2. White River, III.

5. Gravenhurst, II.

7. Elora.

8. Elora, Savanne.

9. Elora, Quebec, IV.

10. Alton, II; Elora, Thedford, IV.

12. Father Point, IV.

13. Minnedosa, III.

14. Beatrice, IV; Chatham, Truro, III; Fredericton, IV.

15. Channel, N. F. I., Stony Creek, II; Burk's Falls, III; Gravenhurst, I; Channel Island, III; Novar, II; Egremont, I; Richmond, III; Barrie, I; Beatrice, III; Elora, Calvin, III; Mattawa, Denbigh, II; London, I; Coldwater, III; Lindsay, III; Deseronto, I; Wallace, I; Saugeen, Norwood, Galt, Chatham, Buda, II; Savanne, Niagara Falls, Clontarf, III; Peterboro', II; Sprucedale, Brantford, Glenbow, II; St. Mary's, Stratford, Georgina, Lucknow, Thedford, II; Midland, I; Cayuga, II; Huntsville, II; Georgetown on I; Scarboro, I; Medicine Hat, Toronto, I; Bancroft.

16. Gravenhurst, II; Channel Island, IV; Novar, IV; Egremont, I; Elora, Savanne, St. Albans, IV; Thedford, IV; Quebec, IV; White River, I; Fredericton, IV; Minnedosa, I; Thedford, IV.

17. Savanne, Georgetown, P. E. I., Port Arthur, Charlottetown, IV.
18. Savanne, Pembina Crossing.
19. Quebec, IV.
20. Posen, II; Elkhorn, Saskatoon, IV; Port Arthur III; White River, III.
21. Channel Island, IV.
23. Posen, IV; Georgetown, P. E. I.

Frost was recorded at Shoul Lake, Manitoba, on the night of the 25th, potatoes being frozen slightly, and at Fort Ellice on same night. In Ontario, at Uplands, frost occurred on 24th, at Alton on 24th, and at Burk's Falls on 24th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF JULY, 1886.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....		0.11	0.38	0.38	0.63	0.58	0.60	0.59	0.63	0.66	0.62	0.57	0.52	0.53	0.19	
AGASSIZ, B.C. ....		.05	.31	.46	.41	.49	.50	.54	.63	.54	.54	.55	.53	.46	.15	
BRANDON.....		.10	.56	.63	.71	.74	.75	.73	.73	.76	.77	.75	.70	.71	.56	0.03
INDIAN HEAD.....																
WINNIPEG.....	0.04	.59	.61	.61	.74	.72	.71	.67	.63	.66	.65	.67	.65	.60	.56	0.05
WOODSTOCK.....	.02	.19	.58	.76	.81	.71	.75	.76	.76	.81	.75	.72	.65	.47	.23	.8
TORONTO.....		.35	.72	.74	.73	.73	.70	.70	.66	.67	.78	.75	.78	.67	.38	
LINDSAY.....	.8	.31	.51	.63	.65	.70	.70	.66	.67	.71	.73	.72	.59	.61	.64	0.34
BARRIE.....		.31	.64	.65	.66	.68	.72	.73	.75	.74	.74	.69	.72	.65	.45	
KINGSTON.....	0.02	.43	.61	.67	.70	.71	.75	.69	.68	.65	.63	.71	.70	.45	0.01	
MONTREAL.....		.28	.54	.56	.58	.59	.66	.70	.72	.69	.62	.57	.62	.49	.01	..
FREDERICTON.....	.8	.27	.36	.48	.63	.67	.65	.69	.70	.73	.68	.64	.65	.52	.40	0.08
SYDNEY.....																

	ESQUIMAULT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Corrected sunshine being 1.)	0.44	0.39	0.58		0.57	0.59	0.62	0.63	0.60	0.60	0.58	0.54
MAXIMUM DAILY AMOUNT.....	0.79	0.87	0.85		0.91	0.97	0.90	0.98	0.89	0.93	0.98	0.94
DATE.....	20	19	28		31	30	27	24	19	19	12	20
NO. OF DAYS COMPLETELY CLOUDED.....	0	3	0		0	0	0	0	0	0	1	4

#### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 509. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	91	69	13	9	83.0
LOWER LAKE REGION.....	114	92	17	5	88.2
UPPER ST. LAWRENCE.....	95	74	14	7	85.3
LOWER ST. LAWRENCE.....	97	72	13	11	82.0
GULF.....	100	80	8	12	84.0
MARITIME PROVINCES.....	102	81	13	8	83.8
TOTAL.....	599	469	78	52	84.8

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer B. C. Webber.

#### STORM WARNINGS.

No storm warnings were issued during the month and no storm was reported as having occurred.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR JULY, 1893.

A slight disturbance prevailed on the first two days of the month. After 4 a.m. of the 3rd the declination magnet moved steadily East up to 8 p.m., accompanied by a slight decrease of the vertical force. Slight irregularities are shown on the night of the 3rd. From the 4th to the 13th there was a marked absence of any disturbance. After 6 a.m. of the 14th a slight disturbing action appeared and a marked decrease of the h. f. was shown between 6 and 10 a.m., nothing of importance followed until 8 p.m. when an Easterly sweep of  $26'$  of the declination magnet took place followed by a gradual recovery, after which the magnet steadied down. The force magnets shew but little changes during the time the declination needle was disturbed. On the 15th the magnets became a little unsteady, and after 8 p.m. an important storm developed. The movements of the declination needle were rapid, and especially so about 11 p.m. The most important change was an Easterly swing of  $1^{\circ} 7'$  at 11:05 p.m. the interval being about twelve minutes. Between 10 p.m. and 1 a.m. of the 16th the declination curve was a series of sharp swings. A rapid decrease of the horizontal component set in after 10 p.m., the magnet vibrating until the minimum was reached at 11:42 p.m. A swift recovery then began lasting to 1 p.m. The v. f. commenced to decrease earlier than the h. f., and a marked increase began at 11:35 p.m. the h. f. not taking up the change for some time afterwards. Between 1:15 and 4 a.m. the force magnets gradually resumed their normal position while the declination magnet oscillated slightly around its mean position.

During the morning hours of the 17th a slight disturbance was recorded, also on the 18th. The 19th and 20th were quiet. All day of the 21st a slight disturbance was going on. The movements during the evening hours were much larger; occasional minor movements continued up to the morning of the 23rd. A little previous to the 8 p.m. observation of the 23rd, the declination needle was on a short Easterly swing. The curves for the 24th and the 25th were unsteady at times, in fact up to the end of the month. The horary curve of declination and horizontal force during the afternoon of the 30th was well marked.

On the 15th, about 9:10 p.m., bright beam of auroral light about  $30^{\circ}$  N. of W. extending towards the Zenith: this band gradually extended across the sky to E. S. E. with a slight motion towards the south, this beautiful band was about  $3^{\circ}$  in width, the vertex passing close to Lyrae Vega; about 9:25 p.m. the band broke up into masses of aurora at right angles to its former position and flowing steadily from E. to W., and shortly after fading out of sight, but the part first noticed remained visible for some time longer; 10:45 p.m., auroral arch and faint streamers in N.; 11:45 p.m., waves of aurora passing to S. of Zenith from W. & E. and forming a corona  $30^{\circ}$  S. of Zenith. The display continued through the early hours of the 16th until gradually obscured by advancing light.

On the 16th at 0:30 some suspicion of aurora in N. not certain.

On the 1st, 3rd, 5th, 6th, 7th, 8th, 9th, 10th, 12th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 26th, 27th, 28th, 30th and 31st the sky was clear but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

The aurora of the 15th was generally observed throughout the Dominion.

CHARLES CARPMAEL

*Director.*

METEOROLOGICAL OFFICE,

Toronto, November 9th, 1893.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

AUGUST, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The chart of mean pressure for August shows the greatest departures below normal (0.15) to have been over the northern part of the Canadian North-west Territories and to the eastward of Newfoundland (0.10 in. at St. John's). The highest mean pressure area, which but slightly exceeded normal, embraced the Lake Region and the more central and western portions of the United States. The most marked feature of the month was the series of severe storms which moved northward from the West Indies and affected various portions of the Dominion between Cape Breton and the Lake Region.

During the 1st a shallow depression was passing eastward across the Lower St. Lawrence Valley and Maritime Provinces accompanied by showery weather.

For the first three days a depression lay over the North-west Territories accompanied by very high temperature; by the morning of the 4th its centre had moved to Lake Superior, whence it passed slowly across the Lake Region there causing, on the 5th, many heavy thunder-storms; further east it coalesced with a small depression which had moved northward from the Atlantic, and heavy rain fell in the western portion of the Maritime Provinces on the 5th and in the eastern portion on the following day; higher pressure which welled down from the northward behind these depressions brought fine weather again, and in the Lake Region it was for some days cooler than during the preceding week.

A very temporary increase in pressure over the North-west Territories on the 4th was succeeded by another low area; the weather continued unusually warm until the 7th when as the storm centre moved eastward, cooler westerly winds became general west of Manitoba, while in that Province on that day the highest temperature of the week was recorded.

The pressure which by the morning of the 8th was above normal over Manitoba and the Territories again decreased during that and the following day with temperature about average and by the evening of the 9th the storm centre was in Manitoba accompanied by local rains. During the 10th it slowly drifted eastward and comparatively cool westerly winds prevailed in Manitoba and the Territories as an area of high pressure spread over the country.

On the 11th as the centre passed across the northern part of the Lake Region, southwesterly and westerly winds and very warm weather prevailed in the southern part of the Province of Ontario and local thunder storms occurred, and next day as it passed across the St. Lawrence Valley to the Gulf there were local rains in Quebec and the western part of the Maritime Provinces. After the 12th the depression hovered giving generally rainy weather in New Brunswick and Nova Scotia for some days.

During the 13th and 14th increasing cyclonic conditions prevailed over the Northwest and Manitoba and on the 14th rain was pretty general there, accompanied by high winds. During the next two days these cyclonic conditions became much less pronounced and fine weather with average temperature prevailed until the 22nd. In the Lake Region, where the pressure had for some time been high there was a change, and on the night of the 16th the weather became rainy as a small cyclonic area from the Southwest States passed across.

A cyclone which seems to have developed between the Bahamas and Bermuda on the 14th moved northeastward and during the 16th absorbed a depression before mentioned as hovering over the Maritime Provinces ; it caused heavy rain and a northeasterly gale in the eastern portion of Nova Scotia on the 17th.

During the 18th, 19th and 20th a feeble cyclonic area covered the Lower Lake Region and Upper St. Lawrence Valley and thunder-storms occurred at many places within its bounds.

On the morning of the 20th a cyclone which had originated near Martinique five days earlier was central to the northward of the Bahamas. Next morning the centre was situated near Lat.  $38^{\circ}$  Lon.  $71^{\circ}$  whence it took a northeasterly course and during the night moved across Nova Scotia from Yarmouth to Northern Cape Breton, passing just north of Halifax, with barometer reading at centre of about 28.80 ; the rainfall throughout the Maritime Provinces was exceedingly heavy and furious gales occurred, the wind at many points reaching hurricane force, driving many vessels ashore, uprooting trees and unroofing houses. After crossing the Gulf it passed rapidly across Newfoundland with diminishing energy.

A very moderate depression which passed across the North-west Territories and Manitoba on the 22nd caused a fall of rain at most places especially in the latter province.

A cyclone of smaller diameter than the last was on the morning of the 23rd, about half way between Bermuda and the mainland—from this it moved northward with increasing energy causing very heavy gales and much damage to shipping near the coast. At 8 a.m., 24th, the centre was near New York city, whence with diminishing energy it moved north-eastward causing a north-easterly gale with rain between Montreal and Quebec that evening, and local rains with fresh to strong winds in the Maritime Provinces at night.

On the 25th a fairly well marked area of low pressure covered the North-west Territories ; that night there were local rains, and the next day as the depression passed eastward higher pressure with cooler weather spread over the country, the temperature going slightly below the freezing point at some places in Alberta and Assiniboia on the night of the 26th, and in Manitoba next night. During the 27th the depression lay over the Upper Lakes, and caused some showers in the Province of Ontario.

The fourth cyclone of the month was central north of the Bahamas on the 25th, it moved directly northward, coming ashore near Savannah, Ga., and causing disastrous gales along the South Atlantic Coast. From Georgia it moved north and northeastward passing over Virginia, Pennsylvania, New York, and thence down the St. Lawrence Valley, causing violent gales throughout its course. On the east end of Lake Ontario during the night of the 28th, the gale was heavy from the northeast, and in other parts more moderate from the north and northeast.

#### TEMPERATURE.

The temperature throughout the Dominion was in general above the average, but the excess is comparatively small.

*The Highest and Lowest Temperatures in each Province during August were :*

British Columbia,  $97^{\circ}2$  on 2nd at Fort Steele ;  $30^{\circ}9$  on 28th at Fort Steele.

North-west Territories,  $109^{\circ}0$  on 6th at Chaplin ;  $29^{\circ}0$  on 10th at Chaplin.

Manitoba,  $105^{\circ}5$  on 7th at St. Albans ;  $30^{\circ}0$  on 26th at Fort Ellice.

Ontario,  $97^{\circ}0$  on 10th at Shannonville ;  $26^{\circ}0$  on 31st at Savanne.

Quebec,  $92^{\circ}8$  on 11th at Richmond ;  $36^{\circ}0$  on 14th at Brome.

New Brunswick,  $106^{\circ}7$  on 11th at Chatham ;  $45^{\circ}0$  on 31st at Dalhousie.

Nova Scotia,  $92^{\circ}0$  on 10th at Halifax ;  $38^{\circ}4$  on 28th at Sydney.

Prince Edward Island,  $91^{\circ}4$  on 11th at Georgetown ;  $48^{\circ}5$  on 27th at Kilmahumag.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, AUGUST, 1893.

PRECIPITATE IN INCHES.										TEMPERATURE OF AIR.				DIRECTION OF WIND FROM.				VELOCITY OF WIND.				PRECIPITATION.							
Mean actual.		Range.		Mean.		Difference from average.		Years observed.		Date.		Mean daily range.		Mean temperature of day.		Mean amount of cloud.		No. of days completely clouded.		Direction of wind from.		Velocity of wind.		Precipitation.					
in.	in.	in.	in.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°				
29.79	30.34	29.35	0.90	66.6	+1.2	9	104	5	28	7	27	31.8	42.1	4	0	2	1	6	4	7	18	4	13	62	2.17	-0.06	12	0	0
29.80	30.34	29.50	0.84	66.6	+1.7	10	81.5	4	26	5	27	24.5	43.0	4	0	3	1	0	3	2	11	35	62	1.89	-0.43	10.21	2	0	
29.80	30.34	29.50	0.84	66.6	+0.3	3	102.5	4	32	10	11	29.7	43.0	4	0	3	1	0	12	2	4	20	10	62	1.86	-0.32	11.20	1	0
29.78	30.22	29.37	0.85	69.6	+3.4	7	92.7	4	35	1	27	31.6	40.1	4	1	2	1	0	1	2	3	10	42	2.28	+0.53	9.22	0	1	
29.84	30.24	29.36	0.88	63.6	+2.1	7	101.2	6	35	1	27	31.6	51.0	4	1	2	1	0	1	2	3	10	42	2.28	+0.53	8.23	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4	10	106.0	6	34	6	11	30.2	42.3	4	1	1	3	2	7	13	11	15	62	0.30	-0.27	6.25	0	1	
29.81	30.29	29.42	0.87	62.2	+2.4																								

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c. — *Concluded.*

PRESSURE IN INCHES.				TEMPERATURE OF AIR.				DIRECTION OF WIND FROM.				VELOCITY OF WIND.				PRECIPITATION.														
Mean.	Barometer.	Highest.	Lowest.	Mean.	Barometer.	Highest.	Lowest.	Date.	Mean daily range.	Mean relative humidity.	No. of days completely clouded.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total number of hours.	Mean miles per hour.	Direction day's velocity.	Date and direction.	Amount.	Difference from average.	No. of days.	No. of showers.	No. of fogs.		
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	13	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7	0	62	3.9	10 2	29 W	1.84	1.11	1	1	0
67.5	29.93	69.4	65.6	67.5	29.93	69.4	65.6	14	27.6-44.0	.....	1	0	10	9	6	18	5	4	3	7										





## PRECIPITATION.

The rainfall during August was, in part of Ontario below the normal, and from Manitoba westward also deficient, the large excess in other districts and provinces being mostly due to the passage of cyclones accompanied by thunder-storms in many localities on the 21st, 28th and 29th.

*The general distribution is as follows :*

In BRITISH COLUMBIA the rainfall was in general 0·88 in., or about 0·26 in., below the average.

In the NORTH-WEST TERRITORIES, 1·83 in., about 0·58 in., below the average.

In MANITOBA the rainfall was 1·54 in., or 1·35 in., below the average.

In ONTARIO, West and South-west District, it was 2·03 in., or 0·51 in., below the average. In the North and North-west District, it was 1·57 in., or 0·57 in., below the average. In the Central District, it was 3·78 in., or 1·74 in. above the average, and in the East and North-east District it was 3·29 in., or 1·19 in., above the average.

In QUEBEC it was 4·95 in., or 1·76 in., above the average.

In NEW BRUNSWICK it was 5·35 in., or 1·73 in., above the average.

In NOVA SCOTIA it was 5·10 in., or 1·46 in., above the average.

In PRINCE EDWARD ISLAND it was 6·54 in., or 2·97 in., above the average.

*Rainfall 5 in. and upwards during month :—*

NEWFOUNDLAND—Channell, 7·37 in.

PRINCE EDWARD ISLAND—Kilmahumaig, 7·45 in., Charlottetown, 7·35.

NOVA SCOTIA—Halifax, 5·96 in.; Sydney, 6·85 in.; Yarmouth, 5·52 in.; Pictou, 5·80 in.; Port Hastings, 10·15 in.

NEW BRUNSWICK—Fredericton, 6·70 in.; Chatham, 7·22 in.; Grand Manan, 6·21 in.; Point Le Preaux, 7·61 in.; St. John, 6·91 in.; Parker's Ridge, 5·75.

QUEBEC—Montreal, 7·37 in.; St. Hyacinthe, 8·89 in.; Grindstone, 5·56 in.; Richmond, 5·10 in.; Chicoutimi, 6·44 in.; Anticosti, W. P., 5·99 in.; Brome, 7·74 in.

ONTARIO—Toronto, 5·76 in.; Deseronto, 5·56 in.; Kingston, 5·25 in.; Ottawa, 8·04 in.; Alexandria, 8·19 in.; Deer Park, 5·94 in.

*Rainfall 1 inch and upwards in 24 hours :*

3. White River, 1·02 in.

5. Georgina, 1·85 in.; Princeton, 1·06 in.

6. Channell Island, 1·63 in.; Barkerville, 1·18 in.; Port Hastings, 1·70 in.; Point Le Preaux, 1·12 in.; Ottawa, 1·17 in.; Halifax, 1·44 in.; Charlottetown, 2·61 in.; Sydney, 1·07 in.

10. Buda, 1·95 in.; Foxton, 1·47 in.; Port Arthur, 1·06 in.

11. Greenwood, 1·02 in.

12. Cottam, 2·02 in.; Yarmouth, 1·01 in.; Bermuda, 1·41 in.

13. Loch Erroch, 1·80 in.; Kilmahumaig, 2·25 in.; Chatham, 2·05 in.; Bermuda, 1·13 in.

14. Channell, Nfld., 1·80 in.; Digby, 1 in.; Port Hastings, 1·15 in.; Saskatoon, 2·10 in.; Henrietta, 1·37 in.; Kilmahumaig, 1·61 in.; Anticosti, W. P., 1·58 in.; Prince Albert, 1·46 in.

15. Port Hastings, 1·25 in.; Grindstone, 1·06 in.

16. Parker's Ridge, 1·02 in.; Cow Bay, 1·05 in.; Chatham, 1·51 in.

17. Channell, Nfld., 1·50 in.; Port Hastings, 2·95 in.; Georgetown, 1·66 in.; Sable Island, 1·56 in.; Charlottetown, 1·03 in.; Sydney, 3·62 in.

18. Pictou, 1·35 in.; Princeton, 1·21 in.; Cowal, 1·91 in.; Whitehead, 2·57 in.; Ottawa, 1·05 in.; Grindstone, 1·95 in.; St. John's, Nfld., 1·00 in.

20. Bognor, 1·00 in.; Owen Sound, 1·15 in.; Port Dover, 1·20.

21. Dalhousie, 1·10 in.; Parker's Ridge, 1·40 in.; Digby, 2 in.; Point Escuminac, 1·41 in.; St. Hyacinthe, 1·01 in.; Fredericton, 2·10 in.; Truro, 1·79 in.; Ottawa, 1·09 in.; Halifax, 2·33 in.; Yarmouth, 3·10 in.; Port Hastings, 2·00 in.; Denbigh, 1·08 in.; Port Ellice, 1·04 in.; Point Le Preaux, 3·60 in.; Fort Ellice, 1·04 in.; St. Andrews, 1·47 in.; Grand Manan, 3·07 in.

22. Cape Magdalen, 1·04 in.; Emerson, 1·12 in.; St. Albans, 1·01 in.; Elkhorn, 1·85 in.; Posen, 1·32 in.; Kilmahumaig, 2·21 in.; Georgetown, 1·18 in.; Beaver Creek, 1·45 in.; Morden, 1·00 in.; Rapid City, 1·00 in.; Rosebank, 1·05 in.; Belmont, 2·01 in.; Chatham, 1·40 in.; Charlottetown, 1·68 in.; Sydney, 1·12 in.; Grindstone, 1·20 in.

23. Rathwell, 1·15 in.

24. St. Hyacinthe, 1·00 in.; Alexandria, 1·20 in.; Montreal, 2·20.

25. Channell, Nfld., 142 in.
26. Glastonbury, 111 in.; Princeton, 129.
27. Ridgetown, 144.; Schreiber, 145 in.
28. Brome, 333 in.; Peterborough, 293 in.; Niagara Falls, S., 156 in.; Galt, 135 in.; Georgetown, 169 in.; Denbigh, 118 in.; Cowal, 137 in.; Ottawa, 195 in.; Toronto, 129 in.
29. Chicoutimi, 110.; Shannonville, 200 in.; Clontarf, 156 in.; Richmond, 187 in.; St. Hyacinthe, 276 in.; Stony Creek, 200 in.; Paris, 172 in.; Lakefield, 108 in.; De Cewsville, 232 in.; Renfrew, 234 in.; Welland, 248 in.; Port Rowan, 127 in.; St. George, 206 in.; Collingwood, 111 in.; Aurora, 142 in.; Blenheim, 188 in.; Oliver's Ferry, 275 in.; Deer Park, 299 in.; Scarboro, 262 in.; Ennis-  
more, 167 in.; Bicquet, 120 in.; Nottawasaga Island, 100 in.; Fredericton, 119 in.; Alexandria, 320 in.; Ottawa, 197 in.; Deseronto, 312 in.; Lindsay, 103 in.; Father Point, 167 in.; Port Dover, 155 in.; Kingston, 371 in.; Quebec, 160 in.; Montreal, 336 in.; Toronto, 141 in.
30. Chicoutimi, 372 in.; Anticosti, W. P., 143 in.

*Thunder recorded on :—*

1. Posen, Channel Island, St. Albans, Scarboro, Georgetown, Niagara Falls S., Brome, Richmond, Deseronto, Toronto.
2. Norway, Hillview, Kilmahumaig, Posen, Niagara Falls S., Regina.
3. Posen, Calvin, White River.
4. Thompson, White River.
5. Mount Forest, Midland, Princeton, Presqu'Isle, Scarboro, Thedford, Georgetown, Lion's Head, Aurora, Cartier, Uplands, Whiteside, Barrie, Galt, Owen Sound, Lucknow, Orillia, Stratford, Niagara Falls, S. Bognor, Cottam, Gravenhurst, Beatrice, Peterboro, Burk's Falls, Alton, Mattawa, Clontarf, Novar, Shannonville, London, Alexandria, Spence's Bridge, Ottawa, Deseronto, Lindsay, Coldwater, Toronto.
6. Saskatoon, Brome, Channell N.F.L., French Creek, Fredericton, Ottawa, Calgary.
7. Pembina Crossing, Point Lepreaux, St. Albans, Brome, Fredericton, Yarmouth.
8. Sable Island, Point Lepreaux, Georgetown, P.E.I., St. John, Truro.
9. Posen, Channel Island, St. Albans, Buda, White River.
10. Owen Sound, Bognor, Channell N.F.L.
11. Mount Forest, Midland, Wiarton, Presqu'Isle, Scarboro, Thedford, Drayton, Lindsay, Georgetown, Upland, Whiteside, Barrie, Egremont, Lucknow, Orillia, White River, Haliburton, Stratford, Point Clark, Gravenhurst, Beatrice, Alton, Elora, Clontarf, London, Coldwater, Port Dover, Toronto.
12. Galt, Point Escuminac, Chicoutimi, Barkerville, Yarmouth.
13. Hillview, Pembina Crossing, Kilmahumaig, Posen, Channel Island, St. Albans, Banff, Agassiz, Loch Erroch.
14. Fort Ellice, Belmont, Sable Island, Emerson, Glen Adelaide, Digby.
15. Truro.
16. St. John, Parker's Ridge, Toronto.
17. Peterboro, Princeton, B.C.
18. Ottawa, Deseronto, Lindsay, Dealtown, Wyoming, Scarboro, Thedford, Georgetown, Uplands, Whiteside, Galt, Orillia, Ridgetown, Haliburton, Beatrice, Peterboro, Glenbow, Stony Creek, Alton, Elora, Calvin, Novar, Banff, Glacier, Princeton, Minnedosa, Toronto.
19. Posen, Midland, Georgetown, Whiteside, Barrie, Egremont, Lucknow, Gravenhurst, Beatrice, Peterboro, Burk's Falls, Glenbow, Alton, Pincher's Creek, Chicoutimi, Coldwater, Parry Sound, Toronto.
20. Scarboro, Georgetown, Barrie, Galt, Owen Sound, Egremont, Stratford, Bognor, Graven-  
hurst, Beatrice, Peterboro, Glenbow, Alton, Woodstock, Coldwater, Medicine Hat, Toronto.
21. Pembina Crossing, Glenbow, Pinchers Creek, Truro, Alexandria, Deseronto.
22. Fort Francis, Fredericton, Qu'Appelle.
23. Buda, Fort Francis, Saskatoon.
24. Pembina Crossing.
25. Hillview, Treherne, Posen, Elkhorn, St. Albans, Calvin, Alexandria.
26. Princeton.
27. Mount Forest, Georgetown, Blenheim, Barrie, Lucknow, Brome, Georgina, Ottawa.

28. Dealtown, Presqu'Isle, Scarborough, Blenheim, Aurora, Uplands, Sprucedale, Orillia, Peterboro, Lindsay, Burk's Falls, Brome, Calvin, Clontarf, Novar, Chicoutimi, Parry Sound, Toronto.

29. Orillia.

31. Posen, Fort Francis.

*Aurora recorded*

When the class of *aurora* is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.

2. Kingston, I.

3. St. Albans, IV; Posen, II.

4. Alexandria, III; Kingston, I.

5. Banff, IV; Elora, St. John, Glenbow, St. Albans, II; Elkhorn, II; Channel Island, Hillview.

6. Donald, Banff, IV; Pinchers Creek, Elora, Gravenhurst, IV; Cottam, *very brilliant*, Bognor, II; Ridgetown, Port Rowan, Lucknow, II; Egremont, II; Barrie, IV; Buda, I; White River, III; Port Arthur, II; Minnedosa, III; Prince Albert, II; Georgetown, I; Thedford, II; Wiarton, Emerson, II; St. Albans, I; Elkhorn, I; Hillview, Fredericton, I; Deseronto, II; Parry Sound, I; Toronto, I.

7. Truro, IV; Coldwater, IV; Novar, IV; Glen Adelaide, Saskatoon, Gravenhurst, IV; Lucknow, IV; Barrie, IV; Buda, II; Cartier, Georgetown, IV; Thedford, IV; Elkhorn, II; Georgetown, P.E.I., Kingston, I; Battleford, IV; White River, I; Quebec, IV; Port Arthur, I.

8. Channel Island, Cape Norman, III; Kingston, I; White River, II; Port Arthur, II; Minnedosa, III.

9. Fredericton, I.

12. Parker's Ridge, Pinchers Creek, Clontarf, IV; Calvin, IV; Burk's Falls, II; Minden, Peterboro', Paris, Gravenhurst, II; Niagara Falls, S., Haliburton, Ridgetown, Kingston, II; Minnedosa, I; Montreal, III; Coldwater, II; Toronto, IV; Hillview, Posen, I; Georgetown, Cape Norman, III; Ottawa, IV; Lindsay, IV; Egremont, III; Galt, Barrie, IV; Buda, III; Georgetown, IV; Thedford, IV; Huntsville, II; Denbigh, III; Wiarton *brilliant*, Midland, II; St. Albans, III; Elkhorn, II; Channel Island.

13. Novar, IV; Calvin, III; Alton, III; Stony Creek, Glen Adelaide, Burk's Falls, II; Gravenhurst, III; Niagara Falls, S., Egremont, IV; Barrie, IV; Barclay, Georgetown, IV; Kingston, I; White River, II; Montreal, III; Denbigh, II; Ottawa, IV.

14. Chicoutimi, IV; Fort Ellice, II; Kingston, II.

15. Novar, IV; Buda, IV; Hillview, Edmonton, III.

16. Hillview.

17. Posen, IV.

18. Yarmouth, III; Channell, N.E.L., II; Alton, III; St. John, N.B., Welland *beautiful*, Egremont, II; Galt, Barrie, II; Buda, I; Midland, IV; Elkhorn, II; Hillview, Georgetown, Truro, III; Edmonton, III; Minnedosa, I; Toronto, III.

19. Glen Adelaide, Buda, III; St. Albans, II; Elkhorn, I; Fredericton, II.

20. Channel Island.

22. Truro, IV; Kingston, III; Prince Albert, II.

23. White River, IV; Prince Albert, III.

28. Point Escuminac *bright*.

30. Posen, II.

*Frosts have been recorded on the following dates:—*

BRITISH COLUMBIA. Enderby, 6th; Vernon, 10th; Donald, 10th.

MANITOBA. Pilot Mound, 12th, 17th, 18th; Fort Ellice, 26th, potatoes and garden stuff frozen; Rathwell, 28th; Gretna, 28th; Shoal Lake, 27th; Rosebank, 27th, 20th; Norquay, 28th; Greenwood, 17th, 24th; Hillview, 28th, ice  $\frac{1}{2}$  in. thick; Treherne, 28th; Pembina Crossing, 28th, temp. 26°; Cartwright, 27th; Emerson, 28th, severe.

NORTH-WEST TERRITORIES. Regina, 11th; Saskatoon, 11th; Chaplin, 10th, vegetables frozen.

ONTARIO. Georgetown, 30th; Cowal, 20th; Beatrice, 30th; Novar, 30th; Uplands, 14th, 30th; Minden, 26th, 30th; Burk's Falls, 13th, 30th; Calvin, 31st; Barclay, 11th, 12th, 18th; Buda, 28th; Savanne, 31st; White River, 20th; Sprucedale, 30th.

QUEBEC. Richmond, 14th.

NEW BRUNSWICK. Parker's Ridge, 31st.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF AUGUST, 1890.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT.....	0 15	0 58	0 09	0 75	0 80	0 90	0 86	0 85	0 84	0 84	0 75	0 57	0 07	0 00	..	..
AGASSIZ, B.C.....	06	23	49	02	70	75	74	82	86	78	71	68	38	06	..	..
BRANDON.....	03	42	65	75	82	81	85	88	87	78	73	81	68	25	..	..
INDIAN HEAD.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
WINNIPEG.....	37	69	72	72	71	79	83	82	81	81	79	71	64	25	..	..
WOODSTOCK.....	03	46	67	79	80	75	80	83	79	79	78	70	49	09	8.	..
TORONTO.....	10	65	67	72	76	73	75	73	74	68	63	72	68	19	..	..
LINDSAY.....	10	47	61	64	70	66	74	66	68	72	64	56	53	47	14	..
BARRIE.....	06	40	56	61	70	65	67	67	67	61	60	56	47	06	..	..
KINGSTON.....	30	61	71	71	70	73	74	74	67	71	66	63	53	16	..	..
MONTREAL.....	03	31	59	61	69	65	67	62	59	58	58	58	42	03	..	..
FREDERICTON.....	05	30	43	53	60	58	65	57	59	57	64	60	56	28	..	..

	ESQUIMAULT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1)	0 64	0 55	0 64	..	0 67	0 64	0 63	0 59	0 52	0 61	0 56	0 59
MAXIMUM DAILY AMOUNT.....	0 89	0 98	0 87	..	0 90	0 81	0 91	0 91	0 90	0 95	0 98	0 90
DATE.....	27	29	8	..	30	31	30	30	13	31	13	23
NO. OF DAYS COMPLETELY CLOUDED.....	1	2	2	..	2	1	0	0	1	3	4	2

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 616. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	94	71	13	10	82 4
LOWER LAKE REGION.....	121	85	16	19	77 5
UPPER ST. LAWRENCE.....	105	82	15	8	85 2
LOWER ST. LAWRENCE.....	100	73	14	13	80 0
GULF.....	97	77	4	16	81 4
MARITIME PROVINCES.....	100	74	17	9	82 5
TOTAL.....	616	462	79	75	81 4

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions, the reports from all observing stations in Canada are used.

The daily probabilities were issued by Probability Officer R. F. Stupart.

STORM WARNINGS.

During the month, warnings on the approach of four storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings

issued was 129, of which 119 were verified. At 22 stations, however, the force did not reach that indicated by the signals displayed; 3 stations reported storms for which no warnings were sent.

In connection with the warnings, predictions as to the probable direction of the winds were given, and of 119 warnings verified as to force 78 were fully verified as to direction.

1. At 10.30 p.m. on the 20th storm signals for a heavy easterly gale were ordered up at Scotia and Fundy stations, owing to the presence on the Atlantic of a West India hurricane, and the following morning at 10.40 a.m., when the cyclone was off the Middle Atlantic coast, the warning was further extended to all Lawrence and Ocean stations. During the evening and night of the 21st the hurricane swept with tremendous violence over the Maritime Provinces, causing great loss of life and property and many vessels were wrecked. Our agent at Point Escuminac reports 60 to 62 miles per hour for three consecutive hours; quite a number of small fishing schooners driven ashore. Shippegan says worst storm for years, a number of fishing boats and schooners went ashore in the harbour. Tignish reports tremendous gale, fishing boats driven ashore and smashed to pieces. Percé reports fourteen boats wrecked. Liscombe says tremendous gale and seas. Liverpool reports storm uprooted trees, demolished chimneys, etc. St. John says gale was very heavy, trees uprooted. Bathurst reports schooner ashore at Grande Anse. Ingonish reports a hurricane, two schooners drove ashore in harbour, six large fishing boats driven out to sea, people left their houses and took shelter in the valleys. The drum was blown from mast out to sea. The steamer "Dorcas" with the barge "Etta Stewart" in tow, were both lost four miles off Halifax and a crew of seventeen perished. Signals were lowered at 11.55 a.m. on the 22nd.

2. Between 10.07 and 10.27 p.m. on the 23rd, Scotia and Fundy were warned for a heavy easterly gale owing to the presence of another West India hurricane off the Middle Atlantic Coast. Next morning the cyclone was centred near New York City and the warning was extended to all Lawrence and Ocean Stations. The hurricane after causing a tremendous gale along the American Coast, travelled a little inland with diminishing energy and by the time its influence was felt in Eastern Canada it had become so reduced that it only caused a moderate gale in some localities and in Cape Breton apparently no storm at all. Signals were lowered at 10.45 p.m. on the 24th.

3. Lake Superior was warned at 10.10 a.m. on the 27th for a moderate northwesterly gale, and the same afternoon Port Arthur reports that a light northwest gale prevailed. The signal was lowered at Port Arthur on the morning of the 28th but continued at Sault St. Marie for storm No. 4.

4. At 4 p.m. on the 28th, the lakes were warned for a heavy N.E. and N.W. gale owing to the approach of yet another West India hurricane, which early on the 28th had passed inland to the Carolinas from the Atlantic and then moved northward. At 10 p.m. the same evening the warning was extended to Quebec, and next morning at 10.20 all Lawrence and Ocean stations were notified to expect a heavy easterly gale. The hurricane centre skirted the eastern portion of Lake Ontario during the early morning of the 29th, and then travelled northward to the lower St. Lawrence Valley and over the Gulf. Its effect was to cause a very severe gale throughout its course, which in the Lake Region began about midnight of the 28th, and in Eastern Canada towards the evening and during the night of the 29th. In the Lake Region the gale veered as predicted, but elsewhere the storm was generally from the southward and westward. Nearly all Lake stations report the storm to have been one of unusual violence, and in Eastern Canada Father Point recorded 13.60 miles per hour, Quebec N.E. 41 miles, Shippegan and Point Escuminac W. to N.W. 50 miles. Tignish reports this has been a very heavy gale almost as destructive as the storms of the 21st. Signals were lowered on the afternoon of the 29th in the Lake Region, and on the morning of the 30th in Eastern Canada.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR AUGUST, 1893.

The first four days were comparatively free from disturbance. On the 5th the curves were a little irregular, and about 11 p.m. the disturbance increased. A little previous to 11 p.m. the declination magnet moved west, at 11.25 a marked sweep of 43' took place, after which the movements diminished and a small disturbance continued to be recorded all morning of the 6th. The magnets, however, differed but little from their normal readings. During the afternoon the movements became slower, but after 9 p.m. they increased considerably, and at midnight an important magnetic storm was being registered. After midnight the declination magnet moved rapidly west, the reading changing over 1° 20' in a short time. Immediately an easterly sweep began.

About a quarter way the magnet paused and oscillated for about ten minutes, and then continued rapidly on its easterly course ; previous to the minimum being reached, another pause was shown followed by oscillations. The range was very large for between 0:25 and 0:50 a.m. a change of  $2^{\circ} 20'$  occurred. After 0:50 a.m. a swift westerly movement of  $1^{\circ} 15'$  began, followed by an easterly one of  $1^{\circ}$ , after which the movements became smaller, but the disturbance was continued during the remainder of the day. A steady change of the magnet to the east was shown between 0:25 and 3 p.m.

Both forces suddenly increased at 10.33 p.m. of the 5th, and the vertical component changing considerably during the night a remarkably steady increase was shown between 10 a.m. and 6 p.m., the horizontal component taking up the change after 2 p.m. Throughout the storm both components were largely decreased. After 6 p.m. they commenced to fall, and from 11 p.m. to 4 a.m. of the 7th; rapid changes were going on. Of the forces the h.f. appears to have felt the disturbance most ; also on the afternoon of the 7th. This storm was followed by a quiet period lasting three days.

After 3 a.m. of the 12th slight disturbing action began and continued up to the morning of the 18th. A moderate disturbance then began, several prominent westerly deflections of the declination needle being registered during the morning. A very rapid one was also recorded at 9.38 p.m. The h.f. was steadily decreasing between 6 and 9.30 a.m. of the 18th, and from 8 a.m. to 1 p.m. the h.f. was increased. Both forces shew simultaneous movements with the 9.38 p.m. westerly declination movement. The 19th was comparatively steady, and was followed on the morning and night of the 20th by a slight disturbance. On the night of the 22nd similar changes were going on and continued up to the morning of the 23rd. The rest of this day was quiet, in fact a steady magnet prevailed up to the night of the 30th. The horary curves of the declination and bifilar on the morning of the 30th were well marked, the westerly sweep of the declination needle during the morning hours being very striking. On the last day of the month a slight disturbance prevailed, and was more noticeable during the night hours.

On the 1st, 2nd, 3rd, 4th, 7th, 8th, 9th, 10th, 13th, 14th, 15th, 17th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 29th, 30th and 31st the sky was clear but no aurora was observed, on all other nights clouds or haze would have hidden any aurora which might have existed. On the 6th a brilliant aurora was observed. At 10 p.m. aurora shining through clouds in North, as the clouds cleared away active and brilliant aurora visible in N. & N. W., at 11.15 corona formed, the principal seat of activity was in N. N. W., aurora strongly tinged with red and yellow. Clouds gradually crept from N. W. and covered the sky. One thing was noticed that though parts of the sky in N. & N. W. looked clear the flashes of aurora shewed the sky was covered with light cirrus clouds. On the 12th Aurora class (IV) from 8 p.m. at midnight bright silvery light. On the 18th class (III & IV) sudden display of aurora in N. N. E. at 9.15. Solid yellow patches with short streamers. At midnight auroral light still visible.

The auroras of the 6th, 12th and 18th were bright and observed generally throughout the Dominion.

CHARLES CARPMAEL  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, December 20th, 1893.





## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

SEPTEMBER, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

Atmospheric pressure was much below the normal over nearly the whole continent the greatest departures being —100 over the Gulf of St. Lawrence and the greater portion of the Maritime Provinces and —130 over Dakota, Montana and Manitoba. Temperature was also very generally below its average except over the United States Prairies where it was a little above the normal. The deficiency was as much as 5° in the Ottawa and St. Lawrence Valleys, and 4° in the far Northwest. Nine low areas were sufficiently well defined to be traced, their mean track was over the Northwest Territories and the Upper Lake Region and down the St. Lawrence Valley, and their mean rate of travel was 25.4 miles per hour. Early in the month a hurricane passed on to the Louisiana coast, but became dispersed before it reached Tennessee.

The morning of the 1st opened with a shallow depression covering Lake Superior accompanied in its immediate vicinity by a few local showers; elsewhere in Canada the pressure was generally above its average more especially in the Northwest, and the weather was fine with temperature about the normal.

During the progress of the depression on the 1st, over the Lake Region and the St. Lawrence Valley its showers were pretty generally distributed, and on the 2nd it gave rain over the Maritime Provinces.

Up to the middle of the month no very marked weather conditions occurred in Canada the distribution of pressure was for the most part anticyclonic from the Lakes to the Atlantic, and cyclonic over other portions of the Country. There were some scattered showers in the Lake Region on the 4th, 7th, and 13th., in the St. Lawrence Valley showers occurred on the 5th, 7th, and 9th, in the Maritime Provinces on the 5th, 7th, 8th, and 10th, and in Manitoba local showers and thunder-storms on the 11th and 14th, but on the whole the weather in all portions of Canada was fine during this protracted interval. Temperature was about its average except in the North-west where at times it became high, 90° was recorded on the 3rd, and 12th, and 82°, and 86° on the 9th, and 10th, respectively. Strong winds prevailed in the North-west between the 12th, and 14th, but as a rule both there and elsewhere the winds were moderate.

A depression which in the first place had passed over the North-west Territories developed much more energy during the night of the 15th, when to the northward of the Lower Lake Region and taken in conjunction with high pressure immediately succeeding it, caused during the 16th, over the Lake Region moderate to fresh gales from the west and north-west together with numerous showers and much cooler weather. Along the St. Lawrence and in the Maritime Provinces, it also gave a gale of short duration on the 16th from the east and south and rain fell heavily and generally.

On the 16th and 17th another comparatively deep depression brought high winds and showery weather over the North-west Territories and Manitoba, and afterwards during its passage to the Atlantic it gave showers and strong winds in the Lower Lake Region and the St. Lawrence Valley between the 18th and 19th, and between the 19th and 20th in the Maritime Provinces. Temperature also rose considerably in Ontario, and on the 19th maxima of over 80° were recorded in many places.

A small anticyclone passed quickly across Canada in rear of the depressions accompanied by a short spell of fine cool weather. During its presence frost occurred locally on the night of the 20th in the Ottawa Valley.

A period of cyclonic conditions then prevailed over the greater portion of Canada, owing to the passage of several depressions none of which, however, were of any great importance. The first of the series gave snow and sleet along our Rocky Mountain slope on the 19th and 20th, and subsequently, rains, high winds and thunder-storms in Manitoba. Then between the 21st and 22nd its showers were very generally experienced from the Lakes to the Atlantic. The next depression, a very shallow one, appeared over Lake Superior on the morning of the 23rd, and afterwards during its rapid passage to the Atlantic it brought some scattered light showers. The third depression apparently had its origin in the North-west States on the 23rd. It increased in energy in its eastward advance and caused rain between the 24th and 25th from the Lakes to the Atlantic, the amount of the fall being greater in Quebec and the Maritime Provinces than elsewhere. The movement of high pressure in its immediate rear afterwards drew very strong winds from the westward over most localities.

The high pressure which made its influence felt in the wake of the depressions, appeared in the far Northwest on the 23rd and at night lowered the temperature to  $18^{\circ}$  at Edmonton,  $28^{\circ}$  at Calgary, and  $20^{\circ}$  at Qu'Appelle. It spread quickly over Canada, its centre passing southward of the Lake Region and thence up the Atlantic Coast and the Maritime Provinces. It was closely followed by a subsidiary high area, the centre of which travelled directly over the Lake Region and the St. Lawrence Valley. In Ontario and Quebec the weather remained fair and cool until the end of the month, interrupted, however, on the 28th, by some local showers in the Lower Lake Region and the Ottawa Valley. Over our Atlantic seaboard, on the other hand, rain set in on the 27th, owing to the influence of a disturbance apparently advancing up the coast, and up to the night of the 30th rain fell frequently and heavily in the Maritime Provinces, and the winds gradually increased to a gale from the northeastward.

In our Northwest pressure gave way rapidly on the 27th in advance of a low pressure system from the Pacific, and between the 28th and the 30th unsettled showery weather and high winds prevailed from the Rockies to Manitoba.

#### TEMPERATURE.

The temperature for September has in general been below the average, the greatest defect occurring in the Ottawa Valley and eastern Ontario.

*The Highest and Lowest Temperatures in each Province during September were :*

British Columbia,  $92^{\circ}2$  on 1st at Fort Steele ;  $25^{\circ}0$  on 25th at Barkerville.

North-west Territories,  $96^{\circ}0$  on 7th at Swift Current ;  $9^{\circ}0$  on 23rd at Regina.

Manitoba,  $100^{\circ}0$  on 3rd at St. Albans ;  $10^{\circ}7$  on 27th at Elkhorn.

Ontario,  $95^{\circ}0$  on 7th at Cottam ;  $14^{\circ}0$  on 28th at Buda.

Quebec,  $77^{\circ}0$  on 15th at Father Point ;  $26^{\circ}0$  on 30th at Brome and Father Point.

New Brunswick,  $80^{\circ}8$  on 14th at Chatham ;  $20^{\circ}0$  on 29th at Parker's Ridge.

Nova Scotia,  $79^{\circ}0$  on 2nd at Port Hastings ;  $28^{\circ}5$  on 12th at Truro.

Prince Edward Island,  $77^{\circ}3$  on 15th at Kilmahumaig ;  $34^{\circ}0$  on 25th at Kilmahumaig.

# PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, SEPTEMBER, 1893.

N. W. TERRITORIES :	PRESSURE IN INCHES.				TEMPERATURE OF AIR.				DIRECTION OF WIND FROM.										VELOCITY OF WIND.				PRECIPITATION.															
	Mean actual.		Mean reduced.		Range.	Mean.	Difference from average.	Years observed.	Highest.	Lowest.	Date.	Lowest.	Mean daily range.	Greatest daily range.	Mean temperature of dewpoint.	Mean relative humidity.	Mean amount of cloud.	No. of days completely clouded.	N.	N. E.	E.	S. E.	S.	W.	N. W.	C.	Total number of hours.	Mean, miles per hour.	Lightest velocity.	Date and direction.	Amount.	Diff. from average.	No. of fair days.	No. of Auroras.	No. of Thunder-storms.	No. of Fogs.		
	in.	in.	in.	in.																																		
Medicine Hat.....	29.82	30.41	29.18	1.43	51.4	47.5	10.9-6.6	80.6	2	23.0	18	28.9	45.8	.....	.....	6	5	4	1	1	1	15	4	14	8	12	90	20	0	9 SW	1.34	-0.36	11	0	0	0	0	
Edmonton.....	29.83	29.46	29.00	1.06	45.6	51.4	3.5-10	80.6	2	17.0	18	28.9	45.8	.....	.....	6	5	4	1	1	1	15	4	14	8	12	90	20	0	9 SW	1.34	-0.36	11	0	0	0	0	
Battleford.....	29.83	29.46	29.00	1.06	45.6	51.4	3.5-10	80.6	2	17.0	18	28.9	45.8	.....	.....	6	5	4	1	1	1	15	4	14	8	12	90	20	0	9 SW	1.34	-0.36	11	0	0	0	0	
Conkuk.....	29.83	29.46	29.00	1.06	45.6	51.4	3.5-10	80.6	2	17.0	18	28.9	45.8	.....	.....	6	5	4	1	1	1	15	4	14	8	12	90	20	0	9 SW	1.34	-0.36	11	0	0	0	0	
Swift Current.....	29.85	30.45	29.27	1.18	49.7	55.9	4.4-9	84.0	8	26.0	19	22.6	40.9	.....	.....	5	4	2	4	4	3	5	21	6	11	90	23	0	14 W	0.54	-0.56	9	0	1	0	0		
Qu Appelle.....	29.82	30.46	29.29	1.17	49.7	55.9	4.4-9	84.0	8	18.0	26	29.7	47.9	.....	.....	5	4	2	4	4	3	5	21	6	11	90	23	0	14 W	0.54	-0.56	9	0	1	0	0		
Regina.....	29.80	30.42	29.33	1.19	45.6	51.4	3.5-10	80.6	2	21.2	23	29.5	50.9	.....	.....	6	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Prince Albert.....	29.80	30.42	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calgary.....	29.84	30.35	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chaplin.....	29.84	30.35	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wallace.....	29.84	30.35	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wain.....	29.84	30.35	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pincher Creek.....	29.84	30.35	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proctor.....	29.84	30.35	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proctor.....	29.84	30.35	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glen Adelaide.....	29.84	30.35	29.33	1.02	45.6	51.4	3.5-10	80.6	2	27.0	21	25.9	43.9	.....	.....	6	5	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Manitoba :	29.82	30.47	29.26	1.21	48.9	54.9	1.0-10	89.8	12	11.2	27	28.9	52.4	.....	.....	4	2	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Minnedosa.....	29.82	30.47	29.26	1.21	48.9	54.9	1.0-10	89.8	12	11.2	27	28.9	52.4	.....	.....	4	2	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Winnipeg.....	29.85	30.43	29.35	1.08	53.2	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Elkhorn.....	29.85	30.43	29.35	1.08	53.2	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Hillview.....	29.85	30.43	29.35	1.08	53.2	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Emerson.....	29.85	30.43	29.35	1.08	53.2	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
St. Albans (Avenue).....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Fort Osborne.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Oak Bank.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Port Ellice.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Bosch.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Brandon.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Chaplin Island.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Oxy.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Rouleau.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Savanne.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Heron Bay.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Chapleau.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Barclay.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Nepigon.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Carleton Place.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
White River.....	29.84	29.09	28.09	1.06	55.8	57.0	8.0-10	80.6	3	12.0	27	31.6	52.5	.....	.....	5	3	0	3	8	9	2	0	16	7	21	90	20	0	23 W	1.43	-0.05	9	21	5	0	0	0
Mississauga.....	29.84	2																																				

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c. --- *Concluded.*

PRESSURE IN INCHES.				TEMPERATURE OF AIR.				HUMIDITY.				DIRECTION OF WIND FROM.				VELOCITY OF WIND.				PRECIPITATION.												
Mean actual.	Highest.	Lowest.	Range.	Mean.	Difference from average.	Yearly observation.	Highest.	Date.	Lowest.	Date.	Mean daily range.	Mean temperature of dewpoint.	Mean relative humidity.	Mean amount of cloud.	No. of days completely clouded.	N.	E.	S.	W.	N.W.	C.	Total number of hours.	Mean, miles per hour.	Highest day's velocity.	Date and direction.	Amount.	in.	No. of days.	No. of Auroras.	No. of Thunder-storms.	No. of Fogs.	
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	54.8	51.8	2.0	53.3	1.5	77.0	31.0	24	26.9	34.0	5	3	2	1	1	1	13	10	10	1	21	30	60			2.75	0.33	10	20	3	0	0
51.8	5																															

ONTARIO—Continued.

[illegible]

## PRECIPITATION.

The rainfall for September in Ontario has been below the average, in Manitoba and the North-west Territories it is also below, in the Maritime Provinces and British Columbia it was in excess, the greatest amount being in Nova Scotia, where about double the usual quantity fell.

*The general distribution is as follows :—*

In BRITISH COLUMBIA the rainfall was in general 2.91 in., or about 1.08 in., above the average.

In the NORTH-WEST TERRITORIES, 0.58 in., about 0.17 in., below the average.

In MANITOBA the rainfall was 0.92 in., or 0.81 in., below the average.

In ONTARIO, West and South-west District, it was 1.42 in., or 1.40 in., below the average. In the North and North-west District, it was 2.34 in., or 1.35 in., below the average. In the Central District, it was 1.50 in., or 1.07 in. below the average, and in the East and North-east District it was 2.48 in., or 0.45 in., below the average.

In QUEBEC it was 3.39 in., or 0.14 in., above the average.

In NEW BRUNSWICK it was 3.30 in., or 0.41 in., above the average.

In NOVA SCOTIA it was 6.26 in., or 2.95 in., above the average.

In PRINCE EDWARD ISLAND it was 3.91 in., or 1.05 in., above the average.

*Rainfall 5 in. and upwards during month :—*

BRITISH COLUMBIA—Abbotsford, 5.18 in.; Loch Erroch, 5.53 in.; Port Simpson, 9.76 in.

ONTARIO—Uplands, 5.38 in.

QUEBEC—Cape Chatte, 5.10 in.

NEW BRUNSWICK—Fredericton, 5.26 in.

NOVA SCOTIA—Yarmouth, 5.26 in.; Pictou, 5.45 in.; Digby, 6.50 in.; Whitehead, 6.52 in.; Port Hastings, 10.60 in.

*Rainfall 1 inch and upwards in 24 hours :*

2. Digby 1.50 in.

5. Port Simpson, 2.16 in.

6. Schreiber, 1.03 in., Waterford, 1.14 in.

7. Stratford, 1.07 in.

8. Point Escuminac, 1.12 in., Niagara Falls S, 1.36 in., Charlottetown, 1.01 in., Grindstone, 1.01 in., Fredericton, 1.37 in.

13. Port Simpson, 1.59 in.

14. Sprucedale, 1.03 in.

15. Glastonbury 1.30 in., Parker's Ridge, 1.00 in., Uplands, 1.04 in.

16. Renfrew 1.16 in., Parker's Ridge 1.50 in., Elora, 1.05 in., Digby 1.50 in., Point Lepreaux 1.70 in., Coldwater, 1.02 in., Fredericton, 2.00 in.

17. Point Escuminac 1.12 in., Georgetown P.E.I. 1.33, Pictou 1.58 in., Richmond 1.10 in., Halifax 1.50 in., Yarmouth, 1.18 in., Charlottetown 1.49 in.

18. French Creek, 1.40 in., Port Hastings, 2.10 in., Grindstone, 1.28 in.

19. Cape Norman, 1.20 in.

21. Agassiz, 1.17 in., Loch Erroch 1.60 in.

23. Port Simpson, 1.84 in.

25. Digby, 1.00 in.

28. Quamichan, 1.01 in., Loch Erroch, 1.15 in., Port Hastings, 3.15 in., Digby 1.50 in.

29. Agassiz, 1.06 in., Loch Erroch, 1.03 in., Vernon, 1.21 in., Whitehead, 1.17 in., St. John, Nfld., 1.42 in.

30. Hartney, 1.25 in., Port Hastings, 1.95 in.

*Thunder recorded on*

1. Bancroft, Burk's Falls, Peterborough, Alexandria.

2. Deseronto.

4. Point Clark.

5. Ridgetown, Pembina Crossing, Alton, Georgetown, Georgina, Alexandria.

6. Thedford, Midland, Coldstream, Fort Francis, Sable Island, Georgina, Minden, Port Rowan, Clontarf, Gravenhurst, Point Clark, Sprucedale.

7. Niagara Falls S, Wyoming, Barrie, Gravenhurst, Galt, Elora, Egremont, Bancroft, Toronto, Princeton, Waterford, Huntsville, Lion's Head, Thedford, Burk's Falls, Presqu'Isle, Whiteside, Lucknow, Peterborough, Stratford, St. Mary's, Norwood, Stony Creek, Alton, Georgetown, Aurora, Mount Forest, Coldwater, Deseronto, London, Port Dover.

8. Fort Ellice, Digby, Haliburton, Hillview, Thompson, Sable Island, St. Albans, St. Andrews.
9. Orillia.
10. Posen, Hillview, Brandon, St. Albans, Belmont, Treherne, Wallace.
11. Fort Ellice, Posen, Fort Francis, Channel Island, Emerson.
12. Wyoming.
13. Coldstream, Georgetown, Wallace.
14. Niagara Falls S., Calvin, Gravenhurst, Bancroft, Wiarton, Lion's Head, Midland, Fort Francis, Stratford, Emerson, Pembina Crossing, Georgetown, Mount Forest.
15. Chicoutimi, Barrie, Posen, Galt, Egremont, Uplands, Port Rowan, Haliburton, Shannonville, Gravenhurst, Bancroft, Glastonbury, Waterford *terrible*, Burk's Falls, Wilton Grove, Fort Francis, Peterborough, Stratford, St. Mary's, Mattawa, Cartier, Denbigh, Norwood, Cowal, Alton, Georgetown, Aurora, Mount Forest, Georgina, Alexandria, Lindsay, Deseronto, London, Toronto.
16. Chicoutimi, Brome, Welland, Wiarton, Blenheim, St. Albans, Alexandria, Woodstock, Ottawa.
17. Niagara Falls S., Posen, Calvin, Peterborough, Norquay.
18. Scarboro, Peterborough, Rosebank, Cowal, Alton.
19. Egremont, Wiarton, Presqu'Isle, Mattawa.
20. Oakbank, Scarboro, Savanne, Selkirk, St. Albans, Treherne, Yarmouth.
21. Scarboro, Norquay, Port Arthur.
22. Uplands, Peterborough.
23. Orillia.
24. Gravenhurst, Blenheim.
25. Elkhorn, Calvin, Shannonville, Brandon, Mattawa, St. Albans, Deseronto.
26. Posen *severe*, Hillview, Rathwell, Norquay, Belmont, Treherne.

*First Snow recorded on—*

16. Pincher Creek, 3 in.
17. Glenbow, 1 in. ; Medicine Hat, 0.4 in. ; Calgary, 0.3 in.
18. Banff, Oonikup, 3 in. ; Swift Current.
19. Glenbow, 1.5 in. ; Edmonton, Battleford, 1 in.
20. Banff, 2.5 in. ; Glenbow, 2 in. ; Barkerville.
21. Prince Albert.
22. Oonikup, 0.5 in. ; Buda, Fort Francis, 1 in. ; Barclay, Greenwood.
23. Buda, Barclay, Emerson, 1 in. ; Pembina Crossing, Greenwood, Pilot Mound, Gretna, 1 in. ; Winnipeg.
24. Barclay, Schreiber.
25. Barclay.
26. Fort Francis, White River, 1.5 in.
27. Burk's Falls, Cartier.
28. Uplands.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Elkhorn, Posen, II ; Chicoutimi, Truro, IV.
2. Hillview, Cape Norman, II.
3. Cape Norman, II.
4. Alexandria, IV.
5. Hillview, St. Albans, IV ; Pembina Crossing, II ; Cape Norman, III ; Mattawa, Burk's Falls, III ; Midland, I ; Huntsville, Chamell, N.F.L., III ; Calvin, Elkhorn, III ; Gravenhurst, IV ; Posen, II ; Fort Ellice, II ; Barrie, III ; Coldwater, IV ; Kingston, IV ; Prince Albert, II ; Port Arthur, II ; Ottawa, IV.
6. Minnedosa, II.
7. Georgina, Chaplin, II ; Hillview, Emerson, III ; Cape Norman, III ; Mattawa, Buda, II ; Port Simpson, I ; Alexandria, I ; Prince Albert, I ; Ottawa, II ; Montreal, III.
8. Hillview, Beatrice, IV ; Richmond, IV ; Gravenhurst, IV ; Barrie, IV ; Glenbow, III ; Alexandria, II ; Coldwater, III ; Ottawa, III ; Toronto, IV ; Montreal, III ; Fredericton, II.

9. Pembina Crossing, IV; Cape Norman, III; Elkhorn, II; Minden, Pincher Creek, IV; Minnedosa, II; Toronto, IV.
10. Point Escuminac, St. Albans III; Burk's Falls, I; Truro, IV; Prince Albert, IV.
11. Pembina Crossing, II; Elkhorn, II; Truro, IV.
12. St. Albans, IV; Pembina Crossing, IV; Elkhorn, I; Posen, III; Prince Albert, I.
13. Hillview, St. Albans, IV; Georgetown, P.E.I., Channell, N.E.L., I; Elkhorn, II; Richmond, IV; Chicoutimi, IV; Alexandria, IV; Truro, IV; Yarmouth, IV.
14. Cape Chatte, Chaplin, I; Point Escuminac, Hillview, St. Albans, IV; Georgetown, P.E.I., Bancroft, IV; Truro, IV; Prince Albert, III.
15. Pembina Crossing, Port Arthur, III.
16. Hillview, Peterborough.
17. Georgetown, IV; Chaplin, IV; Hillview, Pembina Crossing, IV; Cape Norman, III; Burk's Falls, III; Midland, I; Bancroft, IV; Calvin, Welland, IV; Gravenhurst, III; Posen, IV; Glenbow, III; Lindsay, IV; Kingston, IV; Durham, IV; Port Arthur.
18. Hillview, Pembina Crossing, IV; Minden, I; Posen, II; Fort Ellice, II; Truro, IV.
19. St. Albans, IV; Pembina Crossing, III; Port Simpson, III.
21. Point Escuminac, Hillview, Pembina Crossing, IV.
22. Minnedosa, III.
26. Hillview, Cape Norman, II; Elkhorn, I.
27. Hillview, St. Albans, IV; Posen, II; Minnedosa, III.
28. Minnedosa, II.
29. Chicoutimi, IV.
30. Cape Norman, II; Chicoutimi, IV.

*Frost recorded on, when not mentioned the record of 32° or under is taken.*

1. Minden, 31°.
2. Peterborough, Scarborough, Buda, 25°; Bancroft.
3. Salmon Arm, 30°; Egremont, *icc*; Woodstock.
4. Renfrew, 29°; Sprucedale, 29°; Clontarf, 30°; Uplands, 30°.
6. Huntsville, Banff, 32°; Coldwater, 31°.
7. Chicoutimi, 32°.
9. Alton, Chaplin, 29°.
10. Donald, 31°; Fort Steele, 26°; Barkerville, 27°; Chilcotin, 30°; Pincher Creek, 32°.
11. Kilmahumag, Truro, 31°.
12. Kilmahumag.
13. Oakbank, 27°; Foxton, Greenwood.
16. Pilot Mound, St. Albans, Rathwell, Rapid City, Glen Adelaide, Brandon, 25°; Hillview, 26°; Elkhorn, 29°; Posen, 31°.
17. Quesnelle, 27°.
18. Battleford, 32°.
19. Belmont, Treherne, Greenwood, *heavy*; Henrietta, 16°; Oonikup, 26°; Fort Ellice, 14°.
20. Rosebank, Barclay, Fort Francis, 29°; Lindsay, Wallace, 30°.
21. Haliburton, 32°; Sault Ste. Marie, 31°.
22. Mission Valley, 30°; Parker's Ridge, 32°.
23. Georgina, Midland, Oliver's Ferry.
24. Princeton, 31°; Vernon, 29°; Mount Forest, Fort Osborne, 31°; Mattawa, 28°; Beatrice, 31°; Cottam.
25. Dealtown, *killed tender vines*; Coldstream, Welland, Port Arthur.
29. Cowal, *icc*; Chatham, 26°; Oshawa, 31°; Port Rowan, Richmond, 32°; Brome, 30°; Wyoming, *icc*; Toronto.
27. Georgetown, Kilmahumag, Fredericton, 30°.
28. Norwood, 31°; Whiteside, 21°.
29. St. Mary's, 20°; Lucknow, Georgetown, P.E.I., Point des Monts, 29°.
30. St. Hyacinthe, 31°.



PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF SEPTEMBER, 1893.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....	..	00	09	03	56	05	06	059	059	059	060	058	048	007	..	..
AGASSIZ, B.C.....	..	..	..	10	36	42	49	46	44	49	42	31	12	..	..	..
BRANDON.....	..	..	02	32	63	73	77	82	86	84	75	74	68	24	..	..
INDIAN HEAD.....	..	..	00	08	28	55	58	64	65	51	53	52	27	02	..	..
WINNIPEG.....	S.	..	14	50	67	69	69	63	66	69	66	63	44	06	..	..
WOODSTOCK.....	..	01	11	14	17	21	20	22	24	25	39	32	27	20	S.	..
TORONTO.....	..	..	17	51	63	68	71	72	73	69	75	69	67	30	S.	..
LINDSAY.....	..	..	03	23	36	46	57	66	63	68	66	46	36	31	11	..
BARBIE.....	S.	..	17	49	56	59	70	69	65	68	70	70	55	12	..	..
KINGSTON.....	S.	..	26	51	62	65	64	63	57	52	59	62	51	21	..	..
MONTREAL.....	..	..	07	41	50	55	61	59	60	55	56	47	41	03	..	..
FREDERICTON.....	..	..	07	20	43	56	57	56	50	54	53	47	42	24	..	..

	ESQUIMALT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARBIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0 44	0 27	0 59	0 37	0 51	0 24	0 58	0 50	0 53	0 53	0 49	0 43
MAXIMUM DAILY AMOUNT.....	0 87	0 80	0 86	0 78	0 91	0 74	0 91	0 99	0 88	0 90	0 94	0 87
DATE.....	15-24	13	15	23	26	2	29	30	28	11	4	6
NO. OF DAYS COMPLETELY CLOUDED.....	4	10	1	5	5	13	0	3	0	0	6	7

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 576. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	87	63	15	9	81 0
LOWER LAKE REGION.....	109	81	17	11	82 1
UPPER ST. LAWRENCE.....	95	70	13	12	80 5
LOWER ST. LAWRENCE.....	93	66	15	12	79 0
GULF.....	97	72	12	13	80 4
MARITIME PROVINCES.....	95	58	23	14	73 2
TOTAL.....	576	410	95	71	79 4

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officers B. C. Webbe for the first half of the month, and by H. V. Payne for the latter half.

STORM WARNINGS.

During the month warnings on the approach of five storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings

issued was 91, of which 59, or 64·8 per cent, were verified. At 6 stations the force exceeded, and at 7 did not reach that indicated by the signals displayed. 10 stations reported warnings received late owing to delay in issue, and 3 owing to telegraphic delay. A heavy storm occurred on the Lakes on the 16th, for which no warning was issued.

In conjunction with the warnings, predictions as to the probable directions of the wind were given, and of the 59 warnings verified as to force 28, or 47·5 per cent, were fully verified and 46, or 78·0 per cent, were fully and partly verified.

1. On the morning of the 16 there was an important storm centred over the Ottawa Valley, moving rapidly eastward, and at 10.30 o'clock warnings of a moderate south-westerly to north-westerly gale were despatched to the Gulf of St. Lawrence and Maritime Provinces. At most of the stations warned a southeasterly gale began to blow either during the afternoon or evening and afterwards gradually veered to the south and south-west. Signals were lowered during the forenoon of the 17th, the storm having almost completely dispersed over the St. Lawrence Valley.

2. At 10.10 p.m. of the 20th, as there was a developing depression over the North-west States, signals indicating a moderate gale, at first easterly, were ordered for Lake Superior. The storm centre moved first northward and then eastward with diminishing energy and but a very moderate gale was experienced on the Lake during the 21st. Signals were lowered during the evening of the 21st.

3. On the morning of the 23rd, there was apparently a depression developing over the upper Lake Region, and at 11 o'clock in the forenoon cautionary signals for a moderate south-west to north-west gale were ordered for Sault Ste. Marie and stations on the Georgian Bay and Lake Huron. A fresh westerly gale blew that afternoon at Sault Ste. Marie, but at the other stations warned the wind did not exceed a fresh to strong breeze. Signals were lowered early on the 24th.

4. At 10.45 on 25th, owing to a developing depression south of Nova Scotia, signals indicating a north-easterly veering to north-westerly gale were ordered for stations in the Gulf and Cape Breton. North-easterly gales prevailed generally in the districts warned during the 28th, 29th, 30th and 1st as the storm centre first developed and afterwards dispersed near the coast. Signals were lowered on the 29th.

5. At 10.40 p.m. of the 29th, owing to a developing depression over the Western States, signals indicating an easterly gale were ordered for all lake stations. A moderate to fresh easterly gale blew during the 30th on Superior, and strong winds were prevalent on Lake Huron, but the storm was by no means general on the lakes. Signals were lowered early October 2nd.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR SEPTEMBER, 1893.

Slight disturbing action appeared on the night of the 1st, and disappeared after 3 a.m. next morning. On the night of the 2nd, some irregularities were recorded, also on the night of the 4th. After 1 p.m. of the 5th, a steady easterly movement of the declination magnet began, a little before 6 p.m. the movement considerably increased and during the night a moderate disturbance was registered. It passed off about 1.45 a.m. After midnight of the 5th, both forces decreased, followed by a sharp increase at 0.50 a.m. After reaching their normal position both magnets quieted down. Another disturbance appeared on the night of the 7th, after 10 p.m., and continued to 2 a.m., of the 8th, the most important movement of the declination magnet was a westerly sweep of 38' at 0.30 a.m. of the 8th, the extreme taking place at 0.54 a.m. The corresponding change of the forces at these times was a gradual decrease of both components, followed by a rapid recovery of the horizontal component and a gradual one of the vertical. From 8 p.m. of the 8th, to 8 a.m. of the following morning a moderate storm was registered, there were no large departure from the mean, the character of the declination curve being a series of slow waves of disturbance. The force magnets did not appear to be particularly affected. Between 6 and 7 p.m. of the 9th, the declination was disturbed and east of its normal reading, it slowly resumed its normal position and steadied down. Minor changes were going on the 10th, increasing a little after midnight.

From the morning of the 11th, to 8 p.m. of the 13th, a quiet period prevailed. At 8.20 p.m. of the 13th, the declination magnet took a sudden swing to the east, it then gradually resumed its normal position and at 9.30 was quiet. On the two following evenings slight disturbing action was felt. The next disturbance appeared on the evening of the 17th, but there was an absence of any important movement. From 8 to 10 p.m. of the 18th there was a slight disturbance and again on the morning of the 19th. There was nothing of importance noticed until the evening of the 25th, when a slight disturbance appeared which became decidedly more marked after 4 a.m. of the 26th. About 4.30 a.m. the declination magnet moved gradually west until 6.26 a.m., the change amounting to 50'. Some sharp

swings brought the needle to its normal position but it remained slightly disturbed until after 2 p.m. Both forces were decreased on the morning of the 26th, the magnets were also disturbed on this night and to a smaller extent on the night of the 27th. Slight disturbing action appeared on the morning of the 29th, but gradually ceased; it appeared again on the 30th, and was visible to the end of the month.

On the 8th, aurora class (IV) observed at midnight, not very active. On the following night also class (IV). Auroral arch in N at 10 p.m. On the 2nd, 5th, 6th, 10th, 12th, 14th, 17th, 18th, 20th, 22nd, 23rd, 27th, 28th, 29th, 30th, the sky was clear, but no aurora was visible. On all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL

*Director.*

METEOROLOGICAL OFFICE,

Toronto, January 13th, 1893.



## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

OCTOBER, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

The mean atmospheric pressure of greatest departure above normal covered eastern Canada and extended to Newfoundland, being most extreme in Newfoundland where it was at St. John's  $+100$ . In the Lower Lake District it was about normal, as it was also in Alberta and Assiniboia; but over Manitoba and eastward as far as Lake Huron the pressure was generally below normal. The tracks of low pressure areas, which were few in number, were for the most part from the West and South-west States, which from there took a north-easterly path to the Gulf of St. Lawrence. One moved directly east from Alberta to the Gulf, and an important West India hurricane took a path due north from the West Indies to Northern Ontario, and then north-eastward to Labrador. The average rate of movement was 27.9 miles per hour.

1st-9th.—This period was of a marked cyclonic nature, from the extreme North-west to the Lakes, and was attended by more or less unsettled weather and occasional local rains. The temperature was as a rule moderate, and occasional light night frosts occurred in the North-west Province and Territories. An improvement to fine weather took place over the Lakes on the 5th, but next day an important cyclone developed over the Middle States, and showery weather again became general over Ontario.

In the meantime the conditions over Eastern Canada had been anticyclonic and the weather fine and pleasant, excepting the first two days in Nova Scotia and New Brunswick, where a depression off the coast caused rain there.

The cyclone from the Middle States moved across the Lakes north-eastward and dispersed during the 7th over Northern Quebec, after having caused a south-east to south-west gale over the Lake district on the 6th.

Pressure below the normal was general everywhere till the 9th, with fair weather after the 7th.

9th-13th.—A change took place on the 9th, and conditions became more anticyclonic over the Lakes, which was also the case next day in Eastern Canada, and on the 11th an important anticyclone spread over the North-west, bringing fine and colder weather there. The fine anticyclonic weather continued over the Lakes and Eastern Canada, but over the North-west a cyclone passed on the 12th, where the temperature rose again. It was accompanied by little precipitation, and dispersed on the 13th. A West India hurricane, which had first appeared off the Florida Coast on the 11th, moved with marked rapidity and great energy, on the 13th, directly north to the Lakes. It was accompanied by excessive rains, which fell during the night of the 13th and on the 14th. It caused a severe gale over the Lakes and extended as a more moderate storm throughout Eastern Canada. The wind at many points on the Lakes attained almost to hurricane force. At Toronto for six hours during the night of the 13th the velocity was from 52 to 57 miles per hour, and at Goderich it was 76 miles.

After reaching Northern Ontario on the night of the 14th the storm took a north-easterly course and gradually dispersed. In the meantime anticyclonic conditions and fine cool weather had been for the most part prevalent to the west of the Lakes and over the North-west Territories.

15th-21st. During this period the general distribution of pressure was anticyclonic throughout Canada, excepting a slight depression over the North-west Territories on the 15th. Fair weather and moderate temperatures prevailed everywhere and winds were as a rule moderate.

On the 21st a depression passed across the North-west Territories accompanied by high winds and local showers. From thence it travelled south-eastward to the Lakes as a narrow trough ; then expanding it slowly crossed the Lakes on the 23rd and 24th, causing a few showers but otherwise did not disturb the fine weather.

Passing over Eastern Canada on the 25th it caused rain there which was heavy in the greater part of the Maritime Provinces. It was followed by high pressure and fine weather over the Lakes.

The passage of a low pressure area from the South-west States to the Lakes on the 26th interrupted the fine weather there and a moderate rainfall occurred in Ontario. In the North-west also at the same time another depression crossed the North-west Territories also giving showery weather there.

These two depressions coalesced over Northern Quebec on the night of the 27th, by which time an anticyclone had spread over the North-west Territories with fine weather and lower temperature.

Unsettled showery weather continued over the Lakes until the evening of the 28th, showers also fell during the 28th throughout Eastern Canada.

The anticyclone from the North-west extended to the Lakes on the 29th, and gradients for a moderate N. W. gale were formed over that district. The anticyclone soon spread throughout Eastern Canada and the weather was fine and cool with frosts at night from the Lakes to the Atlantic.

Meantime an extended depression spread over the North-west accompanied by generally fair cool weather. This moved eastward on the 31st, when an anticyclone set in over Alberta with colder weather and light snowfalls.

#### TEMPERATURE.

The average temperature to the east of Manitoba has in general been above the normal, and at stations from Manitoba to the Pacific Coast below the normal.

*The Highest and Lowest Temperatures in each Province during October were :*

British Columbia, 74°0 on 14th at Griffin Lake ; 10°0 on 24th at Princeton.

North-west Territories, 72°0 on 15th at Chaplin ; —3°0 on 23rd at Glenbow.

Manitoba, 66°0 on 19th at Hillview ; 3°0 on 28th at Fort Ellice.

Ontario, 85°·2 on 12th at Lucknow ; 0°·9 on 30th at White River.

Quebec, 75°·1 on 13th at Richmond ; 15°·3 on 31st at Richmond.

New Brunswick, 78°0 on 13th at Parker's Ridge ; 21°·2 on 31st at Fredericton.

Nova Scotia, 69°·4 on 1st at Truro ; 21°0 on 26th at Truro.

Prince Edward Island, 66°·3 on 13th at Georgetown ; 27°·4 on 20th at Kilmahumraig.



## PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—*Concluded.*

STATION—Continent.	PRESSURE IN INCHES.			TEMPERATURE OF AIR.			No. of days completely clouded.	DIRECTION OF WIND FROM.					VELOCITY OF WIND.			Amount.	No. of fair days.	No. of fogs.										
	Mean actual.	Highest.	Lowest.	Range.	Mean.	Average.		Highest.	Date.	Lowest.	Date.	Mean daily range.	Mean relative humidity.	Mean amount of cloud.	DIRECTION OF WIND FROM.				Mean miles per hour.	Highest days.	Direction.							
															N.							E.	S.	S. W.	N. W.	C.		
Batavia.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
Beaverhurst.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
North Bruce.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
Rockville.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
Port Hope.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7
St. Mary's.....	30.02	30.51	29.83	1.68	47.8	4.0	76.5	12	17-0	30	19-2.35-0	6	8	1	1	2	30	13	13	1	12	16	93	3.85	0-60	8.25	0	7



ONTARIO—Concluded.

[illegible]

## PRECIPITATION.

The precipitation throughout the Dominion during October has varied considerably ; where the excess is greatest it is almost entirely due to a heavy fall on the 13th and 14th of the month.

*The general distribution is as follows :—*

In BRITISH COLUMBIA the rainfall was in general 4·33 in., or about 1·57 in. above the average.

In the NORTH-WEST TERRITORIES, 0·48 in., about 0·42 in. below the average.

In MANITOBA the rainfall was 1·05 in., or 0·03 in. above the average.

In ONTARIO, West and South-west District, it was 4·25 in., or 1·38 in. above the average. In the North and North-west District, it was 2·98 in., or 0·48 in. below the average. In the Central District, it was 3·38 in., or 0·99 in. above the average, and in the East and North-east District it was 2·61 in., or 0·46 in. below the average.

In QUEBEC it was 2·02 in., or 1·38 in. below the average.

In NEW BRUNSWICK it was 3·32 in., or 0·58 in. below the average.

In NOVA SCOTIA it was 4·83 in., or 0·60 in. above the average.

In PRINCE EDWARD ISLAND it was 5·43 in., or 0·60 in. above the average.

*Rainfall 5 in. and upwards during month :—*

BRITISH COLUMBIA—Rivers Inlet, 21·79 in.; Loch Erroch, 10·03 in.; Abbotsford, 5·56 in.; Agassiz, 6·34 in.

ONTARIO—Cartier, 5·25 in.; Uplands, 5·50 in.; North Bruce, 5·03 in.; Point Clark, 5·58 in.; Lucknow, 6·15 in.; Cottam, 5·36 in.; Stony Creek, 5·75 in.; Georgina, 5·73 in.; Conestogo, 5·52 in.; Sarnia, 5·01 in.; Cowal, 5·20 in.; Sunshine, 6·25 in.; Blenheim, 5·68 in.

NOVA SCOTIA—Halifax, 5·62 in.; Whitehead, 5·41 in.; Sable Island, 6·43 in.; Port Hastings, 7·41 in.

PRINCE EDWARD ISLAND—Georgetown, 5·26 in.; Charlotte, 6·09 in.

*Rainfall 1 inch and upwards in 24 hours :—*

1. Halifax, 1·09 in.; Sydney, 1·18 in.; Chatham, N.B., 1·14 in.; Dalhousie, 1·17 in.; Charlottetown, 1·70 in.; Turtle Mountain, 2·45 in.; Rivers Inlet, B. C., 1·16 in.; Fort Steele, 1·10 in.; Kilmahumaig, 1·73 in.; Georgetown, 1·13 in.; Port Simpson, 1·78 in.; Grand Manan, 1·09 in.

2. Gretna, 1·00 in.; Cow Bay, 1·08 in.; Loch Erroch, 1·06 in.; Fort Francis, 1·58 in.; St. John, Nfld., 1·45 in.

3. Wyoming, 1·20 in.; Point Escuminac, 1·13 in.; Fort Steele, 1·15 in.

4. Cottam, 2·65 in.; Nottawasaga Island, 1·00 in.

5. Thompson, 1·20 in.; St. Johns, Nfld., 1·04 in.

6. Point Clark, 1·03 in.

7. Esquimalt 1·12 in.; Rivers Inlet, 1·94 in.; Fort Steele, 1·10 in.; Loch Erroch, 1·15 in.; Parry Sound, 1·06 in.

8. Fort Steele, 1·00 in.; Port Simpson, 1·19 in.

9. Point des Monts, 1·20 in.

10. Point Escuminac, 1·25 in.; French Creek, 1·20 in.; Kilmahumaig, 1·51 in.; Bathurst, 1·00 in.; Sydney, 1·08 in.

11. Rivers Inlet, 2·92 in.; Salt Springs Island, 1·88 in.; Loch Erroch, 1·47 in.; Quamichan, 1·30 in.

12. Fort Steele, 1·16 in.; St. Johns, Nfld., 1·20 in.

13. Toronto, 1·00 in.; Rivers Inlet, 1·26 in.; Shannonville, 1·00 in.

14. Wyoming, 1·00 in.; Fergus, 2·10 in.; Ennismore, 2·10 in.; Wilton Grove, 2·10 in.; Sarnia, 2·04 in.; Denbigh, 1·30 in.; Glastonbury, 1·00 in.; Coldstream, 3·10 in.; Waterford, 2·80 in.; Renfrew, 1·61 in.; Lucknow, 2·25 in.; Gravenhurst, 1·95 in.; Stony Creek, 3·41 in.; Parry Sound, 2·14 in.; Kingston, 1·10 in.; Rockliffe, 1·21 in.; Whiteside, 1·85 in.; Alton, 2·68 in.; Galt, 2·63 in.; Elora, 1·35 in.; N. Bruce, 1·90 in.; Conestogo, 2·50 in.; Port Stanley, 2·48 in.; Port Dover, 2·28 in.; Digby, 1 in.; Woodstock, 2·90 in.; Point Clark, 3·28 in.; Chatham, 1·47 in.; Beatrice, 2·39 in.; Haliburton, 1·20 in.; St. George, 2·30 in.; Bancroft, 2·37 in.; Clontarf, 1·98 in.; St. Mary's, 2·22 in.; Orillia, 2·34 in.; Paris, 2·75 in.; Lakefield, 1·24 in.; Stratford, 2·41 in.; Niagara Falls, 3·05 in.; DeCewsville, 2·21 in.; Ridgeway, 2·74 in.; Durham, 2·50 in.; Lindsay, 1·30 in.; London, 3·44 in.; Guelph, 2·10 in.; Sturwats Lake, 1·30 in.; Sprucedale, 2·37 in.; Egremont, 2·42 in.; Owen Sound, 2·81 in.; Presqu'Isle, 1·30 in.; Lion's Head, 2·10 in.; Warton, 2·06 in.; Bloomingdale, 2·30 in.; Peterboro',

2'40 in. ; Watford, 2'30 in. ; Thedford, 2'06 in. ; Georgetown, 3'19 in. ; Princeton, 1'57 in. ; Goderich, 1'50 in. ; Midland, 1'82 in. ; Scarboro, 2'47 in. ; Burk's Falls, 1'25 in. ; Cowal, 4'50 in. ; Aurora, 2'13 in. ; Lyons, 2'58 in. ; Mount Forest, 2'16 in. ; Sunshine, 2'16 in., *in 12 hours* ; Dealtown, 1'86 in. ; Blenheim, 2'17 in. ; Thompson, 1'43 in. ; Deer Park, 2'56 in. ; Toronto, 1'26 in. ; Rivers Inlet, 1'98 in. ; Bognor, 2'25 in. ; Minden, 2'17 in. ; Shannonsville, 1'00 in. ; Calvin, 1'63 in. ; Collingwood, 2'21 in. ; Welland, 1'30 in. ; Barrie, 2'10 in. ; Cottam, 1'32 in. ; Norwood, 1'65 in. ; Nottawasaga Island, 3'15 in.

15. Presqu'Isle, 1'40 in. ; Burk's Falls, 1'00 in. ; Thedford, 1'08 in. ; Sunshine, 2'40 in. ; Dealtown, 1'54 in. ; Blenheim, 2'51 in. ; Oliver's Ferry, 1'00 in. ; Uplands, 1'22 in. ; Lucknow, 2'17 in. ; Elora, 1'31 in. ; N. Bruce, 1'19 in. ; Chatham, 1'24 in. ; Coldwater, 2'60 in. ; Truro, 1'02 in.

16. Cape Magdalen, 1'00 in.

18. Port Simpson, 1'29 in.

24. Grand Manan, 1'14 in. ; Port Hastings, 1'90 in.

25. Rivers Inlet, 2'52 in. ; Georgetown, P.E.I., 2'24 in. ; Port Simpson, 1'20 in. ; Yarmouth, 1'23 in. ; Halifax, 1'90 in. ; Port Hastings, 1'10 in. ; Digby, 1'50 in. ; Charlottetown, 2'58 in.

26. Rivers Inlet, 2'47 in. ; Barkerville, 1'10 in. ; Loch Erroch, 1'23 in.

27. Rivers Inlet, 1'19 in. ; Port Hastings, 1'25 in.

28. Fort Steele, 1'30 in. ; Anticosti W. P., 1'06 in. ; Bathurst, 1'10 in.

29. Cape Chatte, 1'03 in. ; Digby, 1'00 in.

**SNOWFALL.**—Snow fell in some part of Manitoba and the North-west Territories as early as the 2nd of the month. The amount of the fall at a few stations was considerable for the month. At Ononkup, 18 in. fell ; at Banff, 13 in. fell ; at Posen, 7 in. ; at Donald, B.C., 27 in. fell ; Barkerville, 23 in. In Ontario snow fell generally about the 28th and 30th.

*Snowfall 2 in. and upwards in 24 hours :—*

2. St. Albans, 3 in.

10. Ononkup, 3 in. ; Battleford, 2 in.

14. Chapeau, 5 in. ; White River, 4 in.

15. Cartier, 3 in. ; Egremont, 4 in. ; Biscotasing, 8 in.

19. Spence's Bridge, 2 in.

20. Spence's Bridge, 3 in.

21. Banff, 8 in. ; Ononkup, 5 in. ; Chaplin, 2 in. ; Calgary, 3 in. ; Battleford, 2 in.

22. Glenbow, 3 in. ; Calgary, 2 in. ; Swift Current, 3 in.

23. Hillview, 2 in. ; Barclay, 4 in.

24. Missanabie, 4 in.

26. Ononkup, 4 in.

27. Posen, 2 in. ; Chapeau, 3 in.

28. Nepigon, 3 in. ; Heron Bay, 2 in. ; Lucknow, 3 in. ; Orillia, 3 in.

29. Egremont, 5 in. ; Haliburton, 2 in. ; Orillia, 2 in. ; Coldwater, 3 in.

30. Missanabie, 4 in. ; Point Clark, 3 in. ; Lakefield, 2 in.

31. Banff, 4 in. ; Battleford, 2 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Gravenhurst, IV ; Lucknow, IV ; Mattawa, Egremont, III ; Burk's Falls, II ; Ottawa, IV ; Durham, IV ; Richmond, III ; Alexandria, II.

2. Clontarf, IV ; Gravenhurst, IV ; Lucknow, III ; Barrie, IV ; Welland, IV ; Cape Chatte, Chicoutimi, III ; Egremont, IV ; Ottawa, IV ; Father Point, III ; Medicine Hat, III ; White River, III ; Kingston, II ; Bancroft, IV ; Alexandria, I.

3. Lucknow, IV ; Savanne, Georgetown, IV.

4. Savanne, St. Albans, III ; Hillview.

5. Georgina, Clontarf, IV ; Gravenhurst, II ; Calvin, IV ; Mattawa, Posen, II ; St. Albans, II ; Port Arthur, II ; Alexandria, II.

6. Channell, II ; Savanne, Medicine Hat, II.

7. Fort Francis, IV.

8. Gravenhurst, IV ; Calvin, IV ; Cape Chatte, St. Albans, III ; Father Point, III

9. Georgina, Clontarf, IV ; Galt, Gravenhurst, IV ; Lucknow, III ; Uplands, Channel Island, III ; Egremont, IV ; Pincher Creek, Georgetown, IV ; Richmond, IV ; Bancroft, IV ; Alexandria, III.
10. Ridgetown, Barrie, IV ; Mattawa, Yarmouth, IV ; White River, I.
11. Calvin, IV ; Oakbank, IV ; Posen, III ; Emerson, III ; St. Albans, III ; Glenbow, III ; Point Escuminac, Ottawa, II ; Durham, IV ; Medicine Hat, II ; Kingston, II ; Alexandria, II.
12. Calvin, IV ; St. Albans, IV ; Truro, III ; Minnedosa, III.
13. Channell, I, St. Albans, III.
14. Hillview, Pincher Creek, Father Point, III.
15. Father Point, IV ; Minnedosa, III.
16. Gravenhurst, IV ; Calvin, Chicoutimi, IV ; Savanne, St. Albans, IV ; Hillview, Georgetown, IV ; Father Point, IV ; Bancroft, IV ; Alexandria, IV.
17. Chicoutimi, III ; Savanne, Pincher Creek, Durham, II ; Truro, IV ; Medicine Hat, IV ; Kingston, IV ; Minnedosa, III.
18. Gravenhurst, III ; Point Escuminac.
20. Truro, IV.
25. Elora, Savanne, Channel Island, III.
26. Minnedosa, II.
29. Hillview, Truro, IV ; Father Point, III.
30. Barclay.

*Thunder or Lightning recorded on—*

2. Bognor, Sable Island, Cottam.
3. Orillia.
4. Bognor.
6. Lion's Head, Wiarton, Mount Forest, Peterborough, Bognor, Calvin, Lucknow, Point Clark, Lindsay.
8. Savanne.
9. St. Hyacinthe, Georgetown, P.E.I., Chicoutimi, St. Andrews, Quebec, Point Lepreaux, Digby, Richmond.
10. Sable Island.
13. Calvin.
14. Galt, Haliburton.
15. Galt.
19. Bermuda.
24. Clontarf, Alexandria.
27. Blenheim.

## HOURS ENDING

	ESQUIMT.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	TORONTO.	LANSAY.	BARILE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshiny being 1.)	0.35	0.18	0.30	0.34	0.59	0.47	0.52	0.46	0.45	0.48	0.46
MAXIMUM DAILY AMOUNT.....	0.57	0.80	0.81	0.80	0.82	0.90	0.99	0.99	0.93	0.88	0.92
DATE.....	12	30	16	16	31	1	1	1	1	1	18
NO. OF DAYS COMPLETELY CLOUDED.....	5	11	10	8	6	12	4	2	3	4	10

The number of predictions issued during the month was 641. These were divided as follows:—

9

did not reach that indicated by the signals displayed : 7 stations reported warnings received late, owing to delay in issue, and 2 stations reported storms for which no warnings were sent.

In connection with the warnings, predictions as to the probable directions of the wind were given, and of the 157 warnings verified as to force, 128 were fully verified, and 29 were fully or partially verified as to direction.

1. At 10.20 a.m. on the 6th Lake stations were warned for a fresh to strong E. through S. to S.W. gale in advance of a deep disturbance then centred in Iowa. During the night of the 6th it caused a fresh to strong gale over the district warned and then became quickly dispersed. Goderich recorded S.W. 62 miles an hour, Pt. Stanley S.W. 48 miles an hour, and Midland, Presqu'Isle, Sarnia, Pt. Burwell, Burlington and Parry Sound report a heavy gale. Signals were lowered at 10.30 a.m. on the 7th.

2. Cape Breton was warned for a moderate N.E. to N.W. gale at 11 a.m. on the 10th as the gradient was steepening in rear of low pressure over the Maritime Provinces. A gale from the directions indicated was experienced over the district notified, but at two stations the storm had begun before the warning arrived. Signals were lowered at 9.40 p.m. on the 10th.

3. Lake Superior was warned at 10.40 a.m. on the 11th, and the other Lakes at 10.15 p.m. the same night for a moderate W. to N.W. storm, as it was considered a depression in the Mississippi Valley would become of more importance. Afterwards it did not develop, and no storm occurred on the Lakes. Signals were lowered on the 12th.

4. At 11 a.m. on the 13th the Lower Lakes were warned for a heavy easterly gale in advance of a West India hurricane which was on the Carolina Coast, and apparently travelling northward. At 10.50 p.m. a warning for a heavy westerly gale was further sent to Sault Ste. Marie, and Scotia and Fundy were notified to expect a storm, and again at 11.30 a.m. on the 14th the remaining Eastern Canada stations were warned. The hurricane moved as anticipated, and a very heavy gale from the eastward set in during the night of the 13th over the Lake Region, and exceptionally heavy rain occurred. Next day, the 14th, the gale was equally severe from the west and north-west, and in some localities even more so. Sault Ste. Marie reports heaviest storm this year. Owen Sound says Str. "City of Collingwood" started out Saturday night, but had to return ; also, that SS. "Manitoba," lying at the elevator, had her bow driven into the dock. Saugeen says, heaviest gale for many years. Toronto Island anemometer recorded 52 to 57 miles an hour for six hours. The Ottawa Valley suffered severely from the storm, but in Eastern Canada, although a fresh to strong gale subsequently prevailed, it was not as severe as in the other districts, owing to the storm's decreasing energy after passing over the Lower Lakes. Signals were lowered in the Lake Region at 9.50 a.m. on the 15th, and elsewhere at 4.15 p.m. the same day.

5. At 10.20 p.m. on the 21st Lake Superior was warned for a heavy S.W. to N.W. storm, a moderate disturbance being then situated in Manitoba. The disturbance decreased in energy as it travelled slowly south-eastward, but on the 23rd it again became reinforced somewhat. At 4 p.m. of this day Lower Lakes were notified to expect a moderate easterly to southerly storm, and at 3.55 p.m. on the 24th, when the depression was over the Lakes, Cone No. 2 for a moderate S.W. to N.W. storm was substituted for No. 1. On the 24th a gale of moderate force extended over the district warned as far as Lake Erie, but on Lake Ontario no storms seems to have occurred. Signals were lowered between the evening and night of the 24th.

6. Lake Erie was warned for a moderate easterly gale at 10.20 p.m. on the 25th, and during the 26th, both Port Stanley and Port Burwell reported that a gale occurred. Signals were lowered at 10 p.m. on the 26th.

7. At 3.35 p.m. on the 27th Lake Superior was warned for a heavy W. to N.W. gale. The same night at 10.10 p.m. the warning was extended to the Georgian Bay and Lakes Huron and Erie, and the next morning at 10.10 a.m. to Lake Ontario. These warnings were issued owing to the advance of a moderate depression, taken in conjunction with a well marked anticyclone in its wake. Subsequently on the 28th, and during the early part of the 29th, a fresh to heavy gale from the west and north-west prevailed throughout the Lake Region. Goderich recorded W. 65 miles an hour, and Midland, Pt. Arthur, Sault Ste. Marie, Bayfield, Pt. Burwell, Tobermory, and Parry Sound report a heavy gale. The storm did not extend to Eastern Canada. Signals were lowered during the night of the 28th and the morning of the 29th.

## TORONTO OBSERVATORY—MAGNETIC REVIEW FOR OCTOBER, 1893.

A slight disturbance was shown on the evening of the 1st, it became more important on the morning of the 3rd, the declination needle after 4 a.m. moving west, a marked maximum taking place at 4.54 a.m. After 6 a.m. the magnets steadied down and continued so until the night of the 5th when slight disturbing action appeared and up to the morning of the 7th slow waves of disturbance were going on particularly on the night of the 5th and morning of the 6th. At 6 p.m. of the 7th the declination needle was unsteady, a slow easterly swing being registered; it came to rest shortly afterwards, but during the early hours of the 8th a little irregularity is shown and the horary curve of declination was well marked after 10 a.m. On the evening of the 9th a small disturbance appeared and became more important on the morning of the 10th but passed off after noon and the magnets remained steady until 10 p.m. of the 11th, when a minor disturbance lasting two hours appeared. From the 12th to the 15th disturbances of a similar character were going on, the most important movement was a westerly swing of the declination magnet previous to 1 a.m. of the 14th. After recovering from a slight disturbance on the evening of the 14th the magnets quieted down until the night of the 16th when a small disturbance appeared and was visible on the following two nights. On the 19th a steady magnet set in and continued for the following four days, the magnets being unusually quiet. During the morning of the 24th the magnets again became slightly disturbed and continued so up to the 30th, the last day of the month being fairly quiet.

On the 2nd 8.30 to 8.50 aurora visible in North class (IV), also on the 4th. On the 10th and 16th suspicion of aurora. On the 29th faint auroral light in N. and N.E. On the 1st, 5th, 6th, 7th, 9th, 11th, 12th, 17th, 18th, 20th, 21st, 22nd, 24th, 25th, 28th and 30th the sky was clear but no aurora was visible. On all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL

*Director.*

METEOROLOGICAL OFFICE,  
Toronto, January 25, 1894.





## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

NOVEMBER, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

In Canada the first half of the month was undisturbed by any important storms. Until the 10th the pressure was generally above average from the Lake Region eastward and below over the North-west Territories; the only decidedly abnormal temperatures reported occurred in Manitoba on the morning of the 3rd when the temperature fell to  $-12$  at Winnipeg.

An area of low pressure passing north-eastward from Nebraska to Lake Superior on the 1st caused a heavy fall of snow that night in eastern Manitoba; passing eastward over northern Canada it caused local rains in the Lake Region during the night of the 2nd, and in Quebec and the Maritime Provinces next day. After this, until the 13th, anticyclonic conditions accompanied by particularly fine weather prevailed from the Lake Region eastward, while more changeable and on the whole cyclonic conditions predominated in the North-west.

During the 12th a depression was welling down from the northward of Manitoba and the Lake Region, while in the North-west Territories there was a falling temperature with increasing pressure. During 13th and 14th the depression moved slowly south-eastward, causing some showers in Ontario and Quebec on the 13th and in the Maritime Provinces on the 14th. On the 15th there was a decided development as it moved to the Gulf, and the weather was rainy in the Maritime Province, while strong westerly winds prevailed over the lakes bringing colder weather with snow flurries, which on the following day spread to the Maritime Provinces.

On the 15th there appeared over the North-west Territories a depression, which moved south-eastward to Minnesota, followed by increasing pressure with falling temperature in the Northwest. On the morning of the 17th the centre was near Sault Ste. Marie, whence it passed across the lakes, and thence down the St. Lawrence valley, giving showers at a few places, and on the 18th a change to a little colder weather as the winds became westerly.

On the 16th there was extensive area of low pressure spreading southward over the Territories and Manitoba with mild weather. All next day it continued to spread southward over the United States, and on the morning of the 21st as an important developing storm was centred in Iowa. Rain fell very generally in the Lake Region during the 21st, the storm centre moving east across Lake Michigan, while increasing pressure was in progress in the North-west Territories, where at night the temperature fell to about zero at most points between the mountains and Winnipeg. Gales from the south-west and north-west were prevalent in the Lake Region between the 22nd and 24th with temperature below the freezing point, and there was a south easterly gale with rain in the Maritime Provinces on the night of the 22nd, and a moderate westerly to northerly gale on the 24th.

The anticyclone following this storm moved slowly across the Continent; the minima temperatures accompanying it occurred in Ontario on the night of the 25th and in the Maritime Provinces on the night of the 26th.

An important cyclone lay off the coast of British Columbia and Washington State on the 23rd and 24th bringing a heavy fall of snow and rain ; by the 25th the storm had almost disappeared, but several slight depressions passed southwards into the Continent, while in the Canadian North-west the pressure continued relatively high with low temperatures. On the 26th there was a developing depression west of the Lower Mississippi Valley ; during the 27th it moved north-east towards the Lake Region where rain fell steadily most of the day. By the morning of the 28th the storm centre was north of the Georgian Bay, whence it moved eastward, giving a heavy fall of rain both in Quebec and the Maritime Provinces.

Immediately behind this area there was another cyclonic development over the Missouri Valley on the 28th, and on the following day this depression caused a pretty general heavy rainfall in Ontario, and on the 30th a lesser amount in the Maritime Provinces. Meanwhile in the North-west the cold had been gradually becoming more intense with increasing pressure until by the morning of the 30th, minima of upwards of  $30^{\circ}$  below zero were pretty general.

#### TEMPERATURE.

The average temperature in the eastern Provinces differed little from the normal, being in the majority of cases slightly in excess. From Manitoba westward the temperature was much below the normal, at some stations being from  $6^{\circ}$  to  $10^{\circ}$  below, and in British Columbia being from  $3^{\circ}$  to  $8^{\circ}$  below the normal.

*The Highest and Lowest Temperatures in each Province during November were :*

British Columbia,  $63^{\circ}\cdot5$  on 14th at Port Simpson ;  $-36^{\circ}\cdot0$  on 30th at Stuart's Lake.  
North-west Territories,  $71^{\circ}\cdot0$  on 1st at Glen Adelaide ;  $-39^{\circ}\cdot0$  on 30th at Saskatoon.  
Manitoba,  $59^{\circ}\cdot7$  on 9th at Minnedosa ;  $-35^{\circ}\cdot0$  on 28th at Posen.  
Ontario,  $70^{\circ}\cdot0$  on 7th at Fort Francis ;  $-24^{\circ}\cdot8$  on 25th at White River.  
Quebec,  $58^{\circ}\cdot0$  on 2nd at Richmond ;  $-3^{\circ}\cdot5$  on 27th at Chicoutimi.  
New Brunswick,  $62^{\circ}\cdot7$  on 3rd at Fredericton ;  $5^{\circ}\cdot9$  on 27th at Chatham.  
Nova Scotia,  $67^{\circ}\cdot6$  on 2nd at Truro ;  $7^{\circ}\cdot5$  on 22nd at Truro.  
Prince Edward Island,  $61^{\circ}\cdot2$  on 3rd at Georgetown ;  $17^{\circ}\cdot0$  on 22nd at Kilmahumraig.





## OSTARIO—Concluded.

[illegible]

## PRECIPITATION.

The rainfall has been less than the average of former Novembers except in part of Ontario and that is mostly owing to the heavy falls which occurred towards the end of the month.

*The general distribution is as follows :*

In BRITISH COLUMBIA the rainfall was in general 3·39 in., or about 0·10 in. below the average. In the interior little or no rain has fallen.

In the NORTH WEST TERRITORIES, the rainfall was 0·04 in., or about half the average quantity.

In MANITOBA the rainfall was 0·20 in., or about double the average quantity.

In ONTARIO, West and South-west District, it was 2·70 in., or 0·53 in. above the average. In the North and North-west District, it was 1·40 in., or 0·46 in. below the average. In the Central District, it was 2·27 in., or 0·35 in. above the average. And in the East and North-east district it was 1·51 in., or 0·20 in. below the average.

In QUEBEC, it was 1·22 in., or 0·48 in. below the average.

In NEW BRUNSWICK, it was 1·75 in., or 1·50 in. below the average.

In NOVA SCOTIA, it was 3·43 in., or 0·61 in. below the average.

In PRINCE EDWARD ISLAND, it was 2·08 in., or 0·91 in. below the average.

*Rainfall 5 in. and upwards during month :—*

BRITISH COLUMBIA—Port Simpson, 7·57 in.; Rivers Inlet, 6·04 in.; Salt Springs Island, 7·91 in.; Agassiz, 9·33 in.; Abbotsford, 9·55 in.; Loch Erroch, 12·01 in.; Quamichan, 7·30 in.; Hazlemere, 8·86 in.

NOVA SCOTIA—Sydney, 5·10 in.; Port Hastings, 5·85 in.

NEWFOUNDLAND—St. Johns, 8·37 in.; Channel, 5·50 in.

BERMUDA, 5·27 in.

*Rainfall 1 inch and upwards in 24 hours :—*

1. Cape Magdalene, 1·60 in.; St. Johns, Nfld., 1·55 in.; Port Simpson, 1·35 in.
3. Rivers Inlet, 1·24 in.; Agassiz, 1·42 in.; Abbotsford, 1·55 in.; Loch Erroch, 1·56 in.; Princeton, 1·00 in.; Quamichan, 1·00 in.; Hazlemere, 1·21 in.
4. Abbotsford, 1·68 in.; Loch Erroch, 1·50 in.
5. Salt Springs Island, 1·28 in.; Agassiz, 1·55 in.; Loch Erroch, 1·05 in.; Quamichan, 1·50 in.; Hazlemere, 1·50 in.; Esquimalt, 1·60 in.
6. Abbotsford, 1·18 in.; French Creek, 1·02 in.; Loch Erroch, 1·03 in.
7. Agassiz, 1·05 in.; Loch Erroch, 1·53 in.; Quamichan, 1·00 in.; Esquimalt, 1·32 in.
9. Cape Magdalene, 1·00 in.
11. Rivers Inlet, 1·68 in.
12. Bermuda, 1·42 in.
13. Channell, 2·00 in.; Sydney, 1·30 in.
20. St. Johns, Nfld., 1·50 in.
21. Blenheim, 1·17 in.
22. Pelee Island, 1·50 in.; Wiarton, 1·13 in.; Presqu'Isle, 1·50 in.
24. Sable Island, 1·87 in.; Salt Springs Island, 1·13 in.; St. Johns, Nfld., 1·10 in.; Quamichan, 1·30 in.
27. Banerott, 1·98 in.; Alton, 1·18 in.; Galt, 1·42 in.; Chatham Ont., 1·45 in.; Elora, 1·10 in.; Pelee Island, 1·50 in.; Point Clark, 1·31 in.; Ridgetown, 1·36 in.; Wiarton, 1·20 in.; Watford, 1·50 in.; Scarborough, 1·10 in.; Thedford 1·13 in.; Dealtown, 1·47 in.; Ennismore, 1·35 in.; Cowal, 1·36 in.; Wilton Grove, 1·00 in.; Wyoming, 1·05 in.; Huntsville, 1·50 in.; Woodstock, 1·40 in.; Port Stanley, 1·36 in.; London, 1·08 in.
28. St. George, 1·22 in.; Norwood, 1·20 in.; Digby, 1·00 in.; Lucknow, 1·07 in.; Lakefield, 1·30 in.; Cottam, 1·00 in.; Paris, 1·25 in.; Peterborough, 1·50 in.; Oliver's Ferry, 1·00 in.; Waterford, 1·55 in.; Burk's Falls, 1·00 in.; Sarnia, 1·36 in.; Lyons, 2·18 in.; Deer Park, 1·14 in.; Bloomingdale, 1·06 in.; Durham, 1·00 in.; Guelph, 1·30 in.
29. Channell, 2·00 in.; Stony Creek, 1·00 in.; DeCewsville, 1·05 in.; Scarborough, 1·02 in.; Thedford, 1·01 in.; Cow Bay, 1·05 in.; Port Hasting, 2·10 in.; Sydney, 1·20 in.; Bermuda, 1·11 in.
30. Deer Park, 1·04 in.

*Snowfall*.—The snowfall in the northern and north-eastern parts of Ontario was above the normal. In Manitoba, North-west Territories and British Columbia the fall in general was large, in some parts extremely so.

The distribution is as follows :—

In the same Districts of Ontario as shown in the rainfall, the amounts are 5·8 in., or 2·9 in. below the average ; 17·7 in., or 2·8 in. above the average ; 6·5 in., or 0·5 in. above the average ; 9·7 in., or 1·5 in. above the average.

In QUEBEC it was 7·1 in., or 5·1 in. below the average.

In NEW BRUNSWICK it was 1·1 in., or 7·5 in. below the average.

In NOVA SCOTIA it was 1·7 in., or 2·5 in. below the average.

In PRINCE EDWARD ISLAND it was 2·9 in., or 5·9 in. below the average.

In MANITOBA it was 13·2 in., or about 8·0 in. above the average.

In the N.-W. TERRITORIES it was about 10·6 in., or 3·5 in. above the average.

In BRITISH COLUMBIA the fall varied from 0·8 in. on the coast to 7·3 in. in the interior, or about 19 in. on the average.

*Snowfall 6 inches and upwards during month.*

BRITISH COLUMBIA.—Esquimalt, 14 in.; Spence's Bridge, 8 in.; Glacier, 73 in.; Quesnelle, 19 in.; Salmon Arm, 17 in.; Pilot Bay, 17 in.; Hazelmere, 8 in.; Quamichan, 8 in.; Princeton, 23 in.; Chilcotin 12 in.; Loch Erroch, 13 in.; French Creek 13 in.; Barkerville, 36 in.; Nicola Lake, 14 in.; Abbotsford, 11 in.; Fort Steele, 23 in.; Donald, 41 in.; Griffin Lake, 40 in.; Agassiz, 20 in.; Rivers Inlet, 31 in.; Stuart's Lake, 10 in.; Mission Valley, 13 in.; Enderby, 13 in.

N.-W. TERRITORIES.—Medicine Hat, 12 in.; Qu'Appelle, 9 in.; Swift Current, 7 in.; Calgary, 12 in.; Oonikup, 16 in.; Glenbow, 10 in.; Pinchers Creek, 32 in.; Banff, 14 in.

MANITOBA.—Winnipeg, 23 in.; Minnedosa, 11 in.; St. Albans, 9 in.; Channel Island, 7 in.; Portage la Prairie, 17 in.; Emerson, 10 in.; Fort Ellice, 9 in.; Oakbank, 23 in.; Posen, 25 in.; Brandon, 7 in.; Pembina Crossing, 8 in.; Hillview, 12 in.; Hartney, 9 in.; Morden, 10 in.; Belmont, 9 in.; Shoal Lake, 20 in.; Pilot Mound, 19 in.; Norquay, 18 in.; Gretna, 7 in.; Treherne, 15 in.; Turtle Mountain, 9 in.

ONTARIO.—Parry Sound, 23 in.; Saugeen, 16 in.; White River, 25 in.; Rockcliffe, 12 in.; Durham, 54 in.; Coldwater, 30 in.; Guelph, 13 in.; Alexandria, 8 in.; Lindsay, 16 in.; Deseronto, 7 in.; Warton, 21 in.; Waterford, 10 in.; Burk's Falls, 19 in.; Midland, 20 in.; Fergus, 21 in.; Scarboro, 6 in.; Georgetown, 12 in.; Ennismore, 7 in.; Denbigh, 7 in.; Lion's Head, 15 in.; Glastonbury, 8 in.; Huntsville, 18 in.; Sunshine, 21 in.; Mount Forest, 44 in.; Presque Isle, 50 in.; Orangeville, 12 in.; Shannonsville, 7 in.; Schrieber, 11 in.; Egremont, 17 in.; Sprucedale, 22 in.; Uplands, 27 in.; Cartier, 14 in.; Savanne, 7 in.; Chappleau, 19 in.; Nepigon, 9 in.; Missanabie, 13 in.; Haliburton, 13 in.; Georgina, 9 in.; Stratford, 19 in.; Sault Ste. Marie, 33 in.; Peterborough, 11 in.; Owen Sound, 22 in.; Bognor, 26 in.; Lakefield, 6 in.; Lucknow, 18 in.; St. Mary's, 22 in.; Point Clark, 7 in.; Gravenhurst, 17 in.; Norwood, 9 in.; Mattawa, 15 in.; Alton, 16 in.; Beatrice, 21 in.; Conestogo, 23 in.; Bancroft, 14 in.; Orillia, 24 in.; Minden, 9 in.; Whiteside, 14 in.; Welland, 6 in.; Barrie, 29 in.; Calvin, 18 in.; Heron Bay, 13 in.; Barclay, 14 in.; Fort Francis, 12 in.

QUEBEC.—Point des Monts, 19 in.; Richmond, 8 in.; Bicquet, 12 in.

NOVA SCOTIA.—Truro, 8 in.

*Snowfall 3 in. and upwards in 24 hours :—*

1. Morden, 6 in.; Belmont, 4 in.; Pilot Mound, 12 in.; Gretna, 3 in., Treherne, 4 in.; Turtle Mountain, 3 in.; Winnipeg, 4 in.; Glacier, 3 in.

2. Norquay, 6 in.; Oakbank, 8 in.; Barkerville, 10 in.; Winnipeg, 4 in.

3. Barkerville, 6 in.

4. Donald, 3 in.; Glacier, 4 in.

5. Glenbow, 3 in.; Banff, 6 in.; Donald, 9 in.; Calgary, 5 in.; Princeton, 6 in.; Glacier, 14 in.

6. Glacier, 5 in.

8. Posen, 8 in.; Glacier, 4 in.

9. Barkerville, 3 in.; Glacier, 4 in.

10. Hartney, 4 in.

11. Posen, 3 in.; Pilot Mound, 4 in.

13. Heron Bay, 3 in.
14. Mount Forest, 6 in.; Sault St. Marie, 3 in.; Owen Sound, 6 in.; Nottawasaga, 10 in.; Bancroft, 4 in.; Princeton, 6 in.
15. Huntsville, 4 in.; Sunshine, 4 in.; Presque Isle (14, 15), 24 in.; Midland, 4 in.; Burk's Falls, 4 in.; Bognor, 9 in.; Wiarton, 10 in.; Sault St. Marie, 6 in.; Orillia, 4 in.; Whiteside, 4 in.; Owen Sound, 6 in.; Biscotasing, 3 in.; Sprucedale, 7 in.; Uplands, 4 in.; Saskatoon, 3 in.; Point Clark, 3 in.; Norwood, 3 in.; Alton, 3 in.; Fort Francis, 6 in.; Parry Sound, 5 in.; Saugeen, 4 in.; Glacier, 7 in.; Coldwater, 3 in.; Guelph, 6 in.
16. Belmont, 5 in.; Treherne, 5 in.; Lion's Head, 15 in.; Fergus, 10 in.; Burk's Falls, 3 in.; Georgina, 6 in.; Barclay, 4 in.; Uplands, 3 in.; Lucknow, 4 in.; Chaplin, 4 in.; Portage la Prairie, 8 in.; Egremont, 7 in.; Richmond, 3 in.; Fort Ellice, 4 in.; Barrie, 8 in.; Conestogo, 4 in.; Winnipeg, 7 in.; Minnedosa, 3 in.; Swift Current, 3 in.; Qu'Appelle, 4 in.; Medicine Hat, 3 in.; Durham, 12 in.
17. Shoal Lake, 6 in.; Norquay, 5 in.; Sault St. Marie, 3 in.; Chicoutimi, 5 in.; Oakbank, 6 in.; Princeton, 5 in.; Salmon Arm, 4 in.
18. Mount Forrest, 3 in.; Wiarton, 6 in.; Parry Sound, 4 in.; Coldwater, 4 in.
19. Huntsville, 3 in.; Presque Isle, 5 in.; Burk's Falls, 6 in.; Sault Ste. Marie, 3 in.; Orillia, 6 in.; Owen Sound, 3 in.; Bognor, 3 in.; Missanabic, 3 in.; Sprucedale, 5 in.; Gravenhurst, 3 in.; Mission Valley, 5 in.; Parry Sound, 7 in.; White River, 3 in.; Durham, 4 in.; Coldwater, 4 in.
20. Sault Ste. Marie, 4 in.; Uplands, 6 in.; Georgetown, P.E.I., 4 in.; Glenbow, 6 in.; Pinchers Creek, 6 in.; Pictou, 5 in.; Banff, 4 in.; Barrie, 5 in.; Enderby, 5 in.; Fort Steele, 5 in.; Nicola Lake, 7 in.; Truro, 5 in.; Pilot Bay, 7 in.; Spence's Bridge, 3 in.
21. Mount Forest, 5 in.; Denbigh, 4 in.; Peterborough, 4 in.; Chapleau, 3 in.; Pinchers Creek, 4 in.; Fort Francis, 4 in.; Salmon Arm, 4 in.; Glacier, 3 in.
22. Mount Forrest, 5 in.; Minden, 3 in.; Biequet, 4 in.; Fort Steele, 3 in.; White River, 4 in.; Quebec, 8 in.; Durham, 6 in.
23. Presque Isle, 9 in.; Midland, 4 in.; Haliburton, 3 in.; Minden, 4 in.; Bognor, 3 in.; Sprucedale, 4 in.; Uplands, 3 in.; Gravenhurst, 9 in.; Point des Monts, 7 in.; Fort Francis, 4 in.; Bancroft, 3 in.; Glacier, 5 in.; Salt Springs Island, 6 in.; Union Mines, 12 in.; Agassiz, 5 in.; Nicola Lake, 3 in.; French Creek, 5 in.; Rockliffe, 4 in.; Chilcotin, 3 in.; Quamichan, 5 in.; Hazlemere, 3 in.; Esquimalt, 12 in.; Durham, 6 in.; Bathurst, 3 in.
24. Sunshine, 3 in.; Posen, 9 in.; Turtle Mountain, 4 in.; Fergus, 3 in.; Midland, 4 in.; Stratford, 7 in.; Minden, 4 in.; Owen Sound, 3 in.; Lucknow, 4 in.; St. Mary's, 8 in.; Barrie, 9 in.; Conestogo, 3 in.; Bancroft, 4 in.; Woodstock, 3 in.; Rivers Inlet, B.C., 11 in.; Barkerville, 6 in.; Medicine Hat, 4 in.; Calgary, 6 in.; Chilcotin, 4 in.; Pilot Bay, 4 in.; Glacier, 9 in.; Durham, 6 in.; Coldwater, 4 in.
25. Owen Sound, 3 in.; Bognor, 3 in.; Barclay, 3 in.; St. Mary's, 6; Elora, 6; Channel Island, 4 in.; Pinchers Creek, 4 in.; Banff, 3 in.; Barrie, 3 in.; River Inlet, B.C., 6 in.; Donald, 5 in.; Abbotsford, 3 in.; Barkerville, 7 in.; Quesnelle, 13 in.; Durham, 4 in.; Coldwater, 3 in.; Guelph, 3 in.
26. Sunshine, 5 in.; Hillview, 4 in.; Hartney, 3 in.; Savanne, 3 in.; Chapleau, 4 in.; Pinchers Creek, 6 in.; Oakbank, 6 in.; Rivers Inlet, B.C., 6 in.; Princeton, 5 in.; Glacier, 4 in.
27. Brandon, 3 in.; Sault St. Marie, 6 in.; Schriber, 6 in.; Missanabic, 3 in.; Chapleau, 5 in.; Biscotasing, 6 in.; Lucknow, 7 in.
28. Presque Isle, 12 in.; Hillview, 3 in.; Norquay, 3 in.; Cartier, 6 in.; Biequet, 5 in.; Portage la Prairie, 3 in.; Mattawa, 6 in.; Point des Monts, 6 in.; White River, 5 in.; Minnedosa, 3 in.
29. Mount Forrest, 4 in.; Aurora, 3 in.; Glastonbury, 6 in.; Thompson, 3 in.; Emmisnore, 3 in.; Georgetown, 4 in.; Oliver's Ferry, 3 in.; Goderich, 3 in.; Orillia, 4 in.; Shannonville, 3 in.; Elora, 6 in.; Alton, 6 in.; Conestogo, 3 in.; Union Mines, 5 in.; Abbotsford, 5 in.; French Creek, 3 in.; Hazlemere, 4 in.; Pilot Bay, 6 in.; Durham, 4 in.; Lindsay, 4 in.
30. Huntsville, 7 in.; Sunshine, 3 in.; Mount Forrest, 8 in.; Orangeville, 11 in.; Princeton, 4 in.; Shoal Lake, 12 in.; Fergus, 5 in.; Orillia, 3 in.; Sprucedale, 4 in.; Lakefield, 4 in.; Point Clark, 4 in.; Calvin, 4 in.; Dalhousie, 4 in.; Norwood, 4 in.; Elora, 3 in.; Point des Monts, 3 in.; Egremont, 5 in.; Richmond, 5 in.; Rivers Inlet, B.C., 4 in.; Parry Sound, 3 in.; Ottawa, 3 in.; Conestogo, 3 in.; Woodstock, 3 in.; Union Mines, 5 in.; Durham, 12 in.



*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Alton, II ; Egremont, III ; Pinchers Creek, Elora, Calvin, Glenbow, III ; Gravenhurst II ; Saskatoon, IV ; Lucknow, II ; Bognor, IV ; Savanne, Middland, IV ; Georgetown Ont., Halifax, IV ; Yarmouth, IV ; St. Andrew, IV ; Durham, II ; Alexandria, I.
2. Posen, II ; Fort Ellice, IV ; Brandon, IV ; Pinchers Creek, Hillview, Pembina Crossing, III ; Port Arthur, IV ; Alexandria, IV.
3. Brandon, I ; Pinchers Creek, Elora, Emerson, II ; Saskatoon, III ; St. Alban, II ; Savanne, Pembina Crossing, II ; Minnedosa, I ; Alexandria, IV.
4. Elora, Calvin, Gravenhurst, IV ; Saskatoon, IV ; St. Alban, IV ; Savanne, Hillview, Pembina Crossing, IV ; Minnedosa, IV.
5. Yarmouth, IV ; Truro, IV.
6. Bancroft, IV ; Egremont, IV ; Calvin, Gravenhurst, IV ; St. Albans, IV ; Alexandria, II ; Truro, IV.
7. Bancroft, IV ; Egremont, IV ; Calvin Gravenhurst, IV ; Saskatoon, IV ; Truro, III.
8. Brandon, Calvin, Saskatoon, IV ; St. Albans II ; Chicoutimi, IV ; Point Escuminac.
9. Calvin Chicoutimi, IV ; Minnedosa, IV.
11. Channel, Nfld. I ; Father Point, II.
12. Saskatoon, IV ; Pembina Crossing, IV ; Father Point, IV ; Truro, IV.
13. Gravenhurst, IV.
14. Channel Island, IV ; Savanne.
16. Truro, IV.
18. Channel Island, IV.
25. Posen, II.
26. Saskatoon, II.
27. Posen, I ; Fort Ellice, III ; Medicine Hat, IV ; Port Arthur, II.
28. Savanne, Minnedosa, IV.
29. Posen, II ; St. Albans, II ; Savanne, Hillview, Father Point, IV ; Truro, IV.
30. Posen, IV ; Savanne, Minnedosa, IV Truro, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF NOVEMBER, 1893.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....				S	0.14	0.28	0.27	0.37	0.36	0.21	0.29	0.15				
AGASSIZ, B.C. ....					.01	15	29	27	33	30	25	04				
BRANDON .....					.17	36	40	44	48	43	38	25	02			
INDIAN HEAD .....					.19	39	40	45	35	34	38	14	8			
WINNIPEG .....					.00	17	21	21	23	23	23	07	—			
WOODSTOCK .....					.05	21	30	38	35	37	30	19	21	8		
TORONTO .....					.07	25	33	40	36	38	31	28	24	13		
LINDSAY .....					.06	18	25	42	30	38	43	33	20	15		
BARRE .....					.04	12	22	17	25	31	26	19	19	09		
KINGSTON .....					.12	33	46	47	41	40	43	47	45	14		
MONTREAL .....					.17	30	42	41	48	44	35	22				
FREDERICTON .....					.05	28	40	47	53	50	45	50	50	25		
.....																
					ESQUIMAULT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)					0.23	0.21	0.32	0.30	0.16	0.26	0.29	0.30	0.19	0.38	0.25	0.40
MAXIMUM DAILY AMOUNT .....					0.84	0.92	0.83	0.83	0.87	0.82	0.92	0.97	0.90	0.94	0.96	0.92
DATE .....					14	14	5	4	30	2	6	6	6	7	6, 10, 26	7
NO. OF DAYS COMPLETELY CLOUDED.....					12	16	10	11	17	14	6	5	11	5	6	5

An earthquake shock was recorded on the 27th November at the following places in Canada, the times given being the local times as recorded by the observers:—

Alexandria, Ont., 11.48<sup>7</sup> a. m., from N. N. W. to S. S. E.; St. Hyacinthe, 11.45 a. m.; Brome, 11.55 a. m.; Richmond, 11.50 a. m., lasting 20 seconds; Montreal, 11.47 a. m., from N. E. to S. W.

Thunder was generally recorded on the 1st and 2nd throughout Ontario.

#### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 630. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	101	73	12	16	78.2
LOWER LAKE REGION .....	121	93	15	13	85.1
UPPER ST. LAWRENCE .....	112	88	15	9	85.3
LOWER ST. LAWRENCE .....	102	75	14	13	89.1
GULF .....	94	69	13	12	89.3
MARITIME PROVINCES .....	100	70	20	10	80.0
TOTAL .....	630	468	89	73	81.3

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer R. F. Stupart.

## STORM WARNINGS,

During the month warnings on the approach of nine storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 290, of which 267 or 92·1 per cent were verified. At 5 stations, however, the force exceeded, and at 69 did not reach that indicated by the signals displayed; 18 stations reported warnings received late owing to delay in issue, and 9 stations owing to delay in transmission.

In connection with the warnings, predictions as to the probable directions of the wind were given, and of the 267 warnings verified as to force, 260 or 97·4 per cent. were fully verified, and 265 or 99·3 per cent. were fully and partially verified as to direction.

No. 1. At 10 p.m. on the 1st, Lake Superior stations were warned for a strong N. to N.W. gale and at 10 a.m. next day, all other lake stations were also warned for a strong gale from the S.W. and N.W.; there being at the time a cyclone developing near Wisconsin. A heavy gale from S.W. and N.W. occurred during the 2nd, on lake Superior and on the Georgian Bay, but on the other lakes the wind did not exceed the force of a moderate gale. Signals were lowered at 10.30 a.m. on the 3rd.

No. 2. At 2.30 p.m. on the 9th signals for a N.E. gale were ordered for Bay of Fundy ports and for a strong N.E. gale at all other eastern stations, owing to a storm off the middle Atlantic coast. There was a strong N.E. gale on the Cape Breton coast, and a moderate gale on the Gulf of St. Lawrence and along the Atlantic coast of Nova Scotia south of Cape Breton; but no storm was reported in the Bay of Fundy. Safety messages were dispatched on the morning of the 10th.

No. 3. Cautionary signals were ordered to be displayed at 10 p.m. on the 10th. at lake Superior ports in advance of a depression over the western States. No storm occurred, as the depression decreased in energy.

No. 4. On the 13th, at 10 a.m. all Georgian Bay and Lakes Huron, Erie and Ontario stations were warned to expect a strong W. to N.W. gale. At the time an area of low pressure was developing over the Lakes. It however, did not become important until the 15th, when steep gradients were formed over the lakes and the wind increased to a fresh to strong gale there from the W and N.W. and continued until the 16th. The depression extended to the Maritime Provinces, its centre being on the night of the 15th over the Gulf of St. Lawrence. It caused a moderate to fresh gale from the S.W. to N.W. in the Gulf of St. Lawrence, and also along the Atlantic coast on the 15th. Signals were ordered down at Lake Stations on the night of the 15th, and at all eastern Stations next morning.

No. 5. In advance of a developing depression which was moving southeastward from the Northwest and was then central over Dakota, Lake Superior stations were warned for a strong easterly gale, and at 11 p.m. the same day, all other lake stations were warned for a strong gale from S.W. and N.W. when Lake Superior stations was changed to "expect a strong gale from N.E. and N.W." the cyclone by that time being central over Minnesota.

The depression crossed the lakes on the 17th, when a heavy storm was reported on Lake Superior from the N. E. to N. W., and a fresh to strong gale from the S. W. to N. W. occurred on the other lakes.

Signals were lowered at 10 p.m. on the 17th at Lake Superior stations, and next morning at 10 a.m. at all other Lake stations, by which time the depression was over Eastern Quebec and was dispersing.

No. 6.—At 10 p.m. on the 20th all Lake stations were warned; Lake Superior for a strong N. E. to N. W. gale, and the other lakes for a strong E. to S. W. gale, in consequence of an extended trough of low pressure extending from the North-west Territories to the Gulf of Mexico. Next morning a well defined cyclone had developed, its centre being then over Iowa. Strong winds had already set in at a few places, but next morning a moderate gale was blowing. It was not till the storm reached Northern Ontario on the 22nd that the heaviest blow occurred, and the wind turned into the S. W. and N. W. Previous to this at 4 p.m. on the 21st, signals had been changed on Lake Superior for a N. W. gale, Ontario and Erie Stations for a S. W. gale and Georgian Bay and Lake Huron Stations for a N. W. and N. gale. On the 22nd Presque Isle reported 36 miles per hour from the S. W.; Saugeen, N. W. 33; Goderich, S. W. 74; Port Stanley, S. W. 44; Toronto, S. W. 41; Kingston, S. W. 35, and Port Arthur reported a heavy gale on Lake Superior.

At 10 p.m. on the 21st all Eastern stations except in Cape Breton District were warned for the same storm, which was then central over Lower Michigan, and next morning Cape Breton stations were also warned.

Nearly all these stations reported a fresh to strong gale from S. E. or N. E. during the 22nd and 23rd. From the lakes the cyclone passed eastward, and on the 24th was absorbed by another cyclone off the Nova Scotian coast.

No. 7. At 3 p.m. on the 24th all Eastern stations were warned for a strong W. to N. W. gale in consequence of the last mentioned depression off the Nova Scotian Coast. This passed north-eastward and caused a moderate to fresh W. to N. W. gale, except in the Bay of Fundy, where no storm was reported.

No. 8. On the 27th at 11 p.m. Bay of Fundy stations were warned for a moderate E. to S. W. storm in advance of steep gradients forming east of a depression then central over Lower Michigan. Next morning a fresh to strong gale set in in the Bay, blowing 48 miles per hour from the S. E. at Grand Manan. Signals were lowered on the morning of the 29th, by which time the depression was passing over the Gulf of St. Lawrence.

No. 9.—At 3 p.m. on the 29th all Lake stations were warned for a strong westerly gale owing to the development of a depression which was then moving over Lower Michigan. A violent storm was reported as having occurred on the 30th on Lake Superior, and a fresh to strong gale from the westward on Lake Huron and the Georgian Bay. Further south on Lakes Erie and Ontario there was only a light to moderate gale.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR NOVEMBER, 1893.

The magnets during the early morning hours of the 1st were quiet, but after 6 a.m. they became unsteady, and during the evening the disturbance assumed a more important character, and from 6 p.m. to 6 a.m. of the 2nd, a large storm was registered. From 6 p.m. to a little previous to the midnight observation the declination magnet was moving in swings ranging from  $5'$  to  $45'$ , and at 11.47 p.m. a rapid easterly change of  $1^\circ$  in a short time took place, the maximum occurring at 0.10 a.m. After this hour a series of vibrations began, the magnet moving to its normal reading, vibrations on a smaller scale continuing in, and at 2 a.m. the disturbance increased activity, the tendency being westward, a second maximum taking place at 2.58 a.m. of the 2nd, and after 6 a.m., the storm gradually passed off. The total range of declination was  $1^\circ, 19'$ . Of the forces the *h. f.* was the most affected, a diminution of both components throughout the disturbance was the prominent feature on the force curves. After 8 p.m. of the 1st the *h. f.* commenced to decrease, and a little before midnight the decrease was considerably accelerated, a marked minimum taking place at 0.20 a.m. of the 2nd, an increase then occurred, but the magnet remained disturbed until 4 a.m. The general effect of the storm was an increase of westerly declination and a decrease of both forces. A quiet magnet prevailed until 8.40 p.m. of the 2nd, when slight disturbing action began and continued to the morning of the 5th, the afternoon hours, however, were generally quiet. Slow easterly sweeps of the declination magnet took place at 7.30 p.m. of the 5th, 11.10 p.m. of the 6th, and 7.55 p.m. of the 7th, the increase of direction in each case being gradual, the change of arc on the 7th being as much as  $40'$ .

From the 8th to the morning of the 14th slight disturbances were going on, when a steady magnet set in, and nothing of any consequence was registered until the 27th, when the movements became a little irregular and continued so up to the end of the month, the most disturbed periods being on the 28th and 29th between 10 and midnight.

On the night of the 1st brilliant aurora observed. During the course of the evening frequent patches of aurora was visible among the hazy clouds in N. and N. E. After taking the midnight observation an auroral display of the 1st class was visible, streamers and waves rising up to and past the zenith, forming a corona around Jupiter; this soon vanished, and little was visible afterwards. This aurora was generally observed throughout Canada as class I and II.

On the 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 13th, 14th, 15th, 23rd, 24th and 29th the sky was clear, but no aurora was visible; on all other nights clouds or haze would have hidden any aurora that might have existed.

CHARLES CARPMAEL  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, 15th March, 1894.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

DECEMBER, 1893.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The greatest departure of pressure below the normal of the month took place over the whole North-west, more especially over Alberta, where it amounted to  $-10$ . Over the Lake district the mean pressure was about or slightly above normal, the greatest departure above normal was over Quebec and the Maritime Provinces, being generally  $+05$  there.

The tracks of area of depression were for the most part from the North-west or Western States. These at first moved south-eastward, then recurving took an easterly course from the Lakes to the Maritime Provinces. One from New Mexico moved due N.E. and one from the West Indies travelled up the Gulf stream and over Nova Scotia.

The dominant weather system over the West at the commencement of the month was decidedly anticyclonic, and this quickly became the rule throughout the Eastern portion of Canada. It was soon broken into by a cyclone which started over Wyoming, moved south-eastward to Arkansas and then north-eastward. By the 3rd it was passing near to but south of the Lakes, causing a general fall of snow from the Lakes to the Atlantic, excepting Nova Scotia, where it gave excessive rains on the 4th. Then fine decidedly cold anticyclonic weather spread over the Lakes and soon extended east.

A cyclone of some importance had passed over the North-west Territories on the 3rd and 4th, giving moderate temperatures throughout that district and light snow in Manitoba. On the 5th this depression passed over the Lakes and after causing light snowfalls in Ontario and strong S. to W. winds with mild weather, dispersed next day. At the same time a West Indian storm was moving up the Atlantic Coast. It passed over Nova Scotia on the 6th, giving a heavy fall of snow and rain, and a strong E. shifting to N. and N.W. gale throughout the Maritime Provinces. Anticyclonic conditions then became more prevalent everywhere and continued until the 9th with the exception of a slight depression in the North-west which caused some snow there on the 7th and 8th.

This depression was on the night of the 9th central over upper Michigan and had increased considerably in energy and rain set in over Ontario. Then a quick movement eastward took place, the cyclone passing over Newfoundland on the morning of the 11th, having caused high W. to N.W. winds everywhere, and rain or snow in Quebec and the Maritime Provinces. Fine and cold anticyclonic weather followed over the Lakes and Eastern Canada. This was temporarily interrupted on the morning of the 12th by a small depression from the S.W., causing a fall of snow in Ontario and Eastern Canada, but that night an important anticyclone spread from the Rockies to the Atlantic, and, with the exception of light local falls of snow in Ontario, fine decidedly cold weather with unimportant winds was prevalent everywhere and continued so until the morning of the 15th, when a depression of some importance from the west was central over Iowa. Snow, turning to rain, set in over Ontario and next day extended throughout the Eastern Provinces, more particularly as snow in Quebec and New Brunswick. The storm passed off the Gulf of St. Lawrence Coast on the morning of the 17th.

Fairer and colder weather then followed, but a cyclone which passed over the North-west Territories on the 7th, giving mild weather, and a gale from the S. & W. there, moved quickly S.E. to the Lake, being on the night of the 18th central over Michigan. Next night it passed off the Gulf of St. Lawrence Coast with decreasing energy. It gave a moderate snowfall throughout the Lake and Eastern Districts and high winds. Fine, colder weather and anticyclonic conditions followed, and from the 19th until the 22nd these conditions continued from the Lakes to the Atlantic. The temperature rose in Ontario, but continued low in Eastern Canada.

In the North-west since the 17th the conditions were anticyclonic and the weather fair and cold until the 19th, then generally anticyclonic conditions succeeded.

On the 21st an important anticyclone appeared over Alberta, strong winds and gales with higher temperature accompanying it. The cyclone soon spread over the whole West, and on the 22nd reached from the Pacific Ocean to Ontario, and next day entirely disappeared over Northern Ontario and the Maritime Provinces. It caused a general but moderate rainfall in Ontario and Western Quebec and southern portion of the Maritime Provinces. Elsewhere east it snowed moderately: throughout the North-west it was accompanied by generally fair weather.

For a short time fair weather succeeded from the Lakes to the Atlantic, but this changed again owing to the formation of two areas of depression, one over the Southern States and the other to the north of Lake Superior. The latter passed quickly eastward as a dispersing area, giving light snow or rain in Quebec and the Maritime Provinces on the 24th. The former soon moved to the Lakes, causing a general fall of rain and mild weather. From thence it travelled quickly eastward over Eastern Canada, and on the morning of the 26th was off the Nova Scotia Coast, having caused snow or rain throughout Eastern Canada.

In the meantime an anticyclone spread over the North west on the 23rd with fine decidedly cold weather. This remained until the 25th, when it took a quick movement eastward in rear of the cyclone, causing steep gradients throughout the Lake and Eastern District, high northerly winds, light snow, and a change everywhere to decidedly cold weather.

There was a general southward movement of all anticyclonic conditions, and from the Rocky Mountains to the Atlantic there succeeded a cyclonic type, with a tendency for W. to S. winds; generally unsettled weather accompanied it, local rains fell in Ontario and snow elsewhere.

These cyclonic conditions continued until the 29th when an important anticyclone appeared over the North-west Territories bringing decidedly cold weather there, the temperature falling to  $34^{\circ}$  in Manitoba, but the temperature was not so severe further west.

This anticyclone soon spread to the Lakes and Eastern Canada. There was a decided change to colder weather, the temperature falling below zero in Northern Ontario and in Quebec.

Until the end of the month a slow recovery to higher temperature took place the pressure decreasing and the weather being unsettled everywhere. A fall of snow occurred on the 31st in Ontario and Eastern Canada, also in Assiniboia.

## TEMPERATURE.

The temperature has in general been below the normal, except in British Columbia, the excess there is by no means large, the greatest defect occurred in parts of Manitoba and N.W. Territories.

*The Highest and Lowest Temperatures in each Province during November were :*

British Columbia,  $50^{\circ}5$  on 6th at Port Simpson :  $-24^{\circ}0$  on 11th at Stuart's Lake.

North-west Territories,  $55^{\circ}0$  on 21st at Saskatoon. :  $-48^{\circ}5$  on 10th at Oonikup.

Manitoba,  $41^{\circ}0$  on 17th at Fort Ellice :  $-42^{\circ}5$  on 13th at Oak Bank.

Ontario,  $61^{\circ}0$  on 24th at Cottam :  $-51^{\circ}5$  on 11th at White River.

Quebec,  $41^{\circ}0$  on 19th at Brome :  $-38^{\circ}5$  on 14th at Richmond.

New Brunswick,  $52^{\circ}0$  on 6th at St. Andrews :  $-26^{\circ}0$  on 15th at Fredericton.

Nova Scotia,  $60^{\circ}2$  on 4th at Truro :  $-14^{\circ}5$  on 15th at Truro.

Prince Edward Island,  $55^{\circ}4$  on 4th at Georgetown :  $-7^{\circ}4$  on 14th at Charlottetown.







ONTARIO—Concluded.

[illegible]

## NEWFOUNDLAND:

St. Johns Channel.....	5	1-0	14	14-0-35-0	.....	6	10	15	7	9	2	6	4	14	24	27	0	93	.....	45-0	4-2W	6-37	-	1-45	14-7	0	0	
St. Johns Channel.....	25-4	—	46-8	.....	.....	9	19	17	9	2	6	4	14	24	27	0	93	.....	45-0	4-2W	6-37	-	1-45	14-7	0	0		
P. E. ISLAND :																												
Kilauea.....	19-9	-	25-15	46-8	.....	.....	1	6-5	15	16-2	36-7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Geopline.....	22-9	-	47-4	.....	.....	.....	4	-3	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14	16-1	31-6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte.....	22-9	-	1-17	48-3	.....	.....	4	-7	14																			

BRITISH COLUMBIA:

[illegible]

## PRECIPITATION.

The rainfall throughout the Dominion, with the exception of the Province of Quebec, has considerably exceeded the normal amount.

*The general distribution is as follows:—*

In BRITISH COLUMBIA the rainfall on the coast was 10·27 in., or about 4·00 in. above the average in the interior little or no rain has fallen.

In the NORTH-WEST TERRITORIES rain only fell at two or three stations.

In MANITOBA no rain has fallen.

In ONTARIO, West and South-west District, it was 2·52 in., or 1·05 in. above the average. In the North and North-west District, it was 1·39 in., or 0·59 in. above the average. In the Central District, it was 2·66 in., or 1·62 in. above the average. And in the East and North-east district it was 0·84 in., or 0·06 in. above the average.

In QUEBEC, it was 0·24 in., or 0·71 in. below the average.

In NEW BRUNSWICK, it was 2·33 in., or 0·75 in. above the average.

In NOVA SCOTIA it was 5·43 in., or 1·86 in. above the average.

In PRINCE EDWARD ISLAND, it was 2·24 in., or 0·49 in. above the average.

*Rainfall 5 in. and upwards during month:—*

BRITISH COLUMBIA—Rivers Inlet, 14·37 in.; Salt Springs Island, 5·32 in.; Union Mines, 8·37 in.; Agassiz, 11·36 in.; Esquimalt, 9·45 in.; Abbotsford, 11·77 in.; Loch Erroch, 17·39 in.; Quamichan, 5·60 in.; Hazlemere, 8·93 in.

NEW BRUNSWICK—St. John, 5·59 in.; Grand Manan, 5·31 in.

NOVA SCOTIA—Halifax, 8·15 in.; Yarmouth, 6·06 in.; Sydney, 5·65 in.; Whitehead, 6·25 in.

*Rainfall 1 inch and upwards in 24 hours:—*

1. Rivers Inlet, 2·06 in.
2. Channell, 1·00 in.
3. Point le Preaux, 1·10 in.; Rivers Inlet, 1·34 in.; Port Simpson, 1·23 in.
4. Channell, 1·60 in.; Kilmahumhaig, 1·8 in.; Digby, 1·00 in.; Whitehead, 1·07 in.; Pictou, 1·46 in.; Port Hastings, 1·60 in.; Cow Bay, 1·62 in.; Georgetown, P.E.I., 1·09 in.; St. Andrews, 1·35 in.; Halifax, 2·05 in.; Grand Manan, 1·75 in.; Sydney, 1·41.
5. Port Simpson, 1·95 in.
6. Channell, 1·25 in.; Port Hastings, 1·20 in.; Georgetown, 1·03 in.; Truro, 1·05 in.; Halifax, 2·46 in.; Yarmouth, 1·10 in.; Sydney, 1·65 in.
7. Loch Erroch, 1·40 in.
9. Abbotsford, 1·62 in.; Agassiz, 1·32 in.; Rivers Inlet, 1·43 in.; Esquimalt, 1·00 in.
10. Fergus, 1·83 in.; Loch Erroch, 1·90 in.; Agassiz, 1·08 in.; Halifax, 1·04 in.
15. Esquimalt, 2·00 in.; London, 1·48 in.; Guelph, 2·50 in.; Conestogo, 2·13 in.; Alton, 2·05 in.; Egremont, 2·10 in.; N. Bruce, 1·74 in.; Paris, 2·17 in.; Cowal, 1·03 in.; Mount Forest, 1·03 in.; Wilton Grove, 1·20 in.; Sunshine, 2·10 in.; Watford, 3·20 in.; Georgetown, Ont., 1·55 in.; Princeton, 1·59 in.; Shannonville, 1·20 in.; Owen Sound, 1·15 in.; Coldstream, 1·29 in.; Lyons, 1·22 in.; Fergus, 2·02 in.; Sarnia, 1·38 in.; Waterford, 2·10 in.; St. Mary's, 2·10 in.; Stony Creek, 2·22 in.; Bognor, 1·54 in.; DeCewsville, 1·56 in.; Port Rowan, 1·02 in.; Deer Park, 1·08 in.; Elora, 2·77 in.; Point Clark, 1·30 in.; Stratford, 1·75 in.; Bloomingdale, 2·44 in.; Lucknow, 2·11 in.; Dealtown, 1·17 in.; Thedford, 2·10 in.; Hazlemere, 1·22 in.; Loch Erroch, 1·80 in.; Abbotsford, 3·52 in.; Agassiz, 1·62 in.; Salt Springs Island, 1·64 in.
16. Port Simpson, 2·61 in.; Point le Preaux, 1·65 in.; Digby, 1·00 in.; Pictou, 1·08 in.; Thorold, 1·50 in.; Georgetown, Ont., 1·49 in.; Orangeville, 1·10 in.; Hazlemere, 1·40 in.; Quamichan, 1·60 in.; Agassiz, 1·07 in.; Esquimalt, 1·13 in.
17. Channell, 1·60 in.; Yarmouth, 1·22 in.; Grand Manan, 1·00 in.
19. Abbotsford, 1·05 in.; Bermuda, 1·53 in.
20. Loch Erroch, 1·03 in.; Abbotsford, 1·12 in.; Union Mines, 1·75 in.
21. Loch Erroch, 1·40 in.; Rivers Inlet, 1·27 in.
22. Pt. Pelee, 1·20 in.; Heron Bay, 1·00 in.; Presqu'Isle, 1·20 in.; Union Mines, 1·75 in.
23. Union Mines, 1·49 in.
24. Sault Ste Marie, 1·00 in.; Mattawa, 1·00 in.; Birnam, 1·07 in.
25. Presqu'Isle, 1·20 in.; Kingston, 1·08 in.
- Port Simpson, 1·31 in.
31. Loch Erroch, 1·43 in.

*Snowfall*.—The average snowfall has in general far exceeded the normal quantity except in some cases when the defect was but slight.

The distribution was as follows:—

BRITISH COLUMBIA.—Snow fell on the coast and in Vancouver Island to a limited amount. In some parts of the interior the amount has been extremely large.

In the N.-W. TERRITORIES 8 in. has fallen, about two in. more than 1892.

In MANITOBA 7·4 in. has fallen, about 1 in. below the average.

In the same Districts of Ontario as in the rainfall, 19·2 in. or 4 in. above the average, 34·0 in. or 9 in. above the average, 21·4 in. or 6·7 in. above the average, 30·1 in. or 11·3 in. above the average.

In QUEBEC 30·5 in., or 9·1 in. above the average.

In NEW BRUNSWICK, 37·0 in., or 17·8 in. above the average.

In NOVA SCOTIA, 18·3 in., or 1·9 in. below the average.

In PRINCE EDWARD ISLAND, 38·1 in., or 18·1 in. above the average.

*Monthly snowfall 12 inches and upwards.*

BRITISH COLUMBIA.—Glacier, 136 in.; Enderby, 22 in.; Quesnelle, 18 in.; Salmon Arm, 23 in.; Pilot Bay, 28 in.; Barkerville, 51 in.; Nicola Lake, 14 in.; Agassiz, 14 in.; Rivers Inlet, 23 in.; Stuart's Lake, 44 in.

N.-W. TERRITORIES.—Edmonton, 32 in.; Saskatoon, 12 in.; Oonikup, 14 in.

MANITOBA.—Hillview, 14 in.; Posen, 13 in.

ONTARIO.—Coldwater, 58 in.; Alexandria, 44 in.; Ottawa, 44 in.; Guelph, 25 in.; Deseronto, 31 in.; London, 25 in.; Durham, 43 in.; Stratford, 21 in.; Lindsay, 36 in.; Rockcliffe, 27 in.; Port Stanley, 23 in.; Kingston, 23 in.; Parry Sound, 66 in.; Saugeen, 46 in.; White River, 22 in.; Port Dover, 26 in.; Toronto, 19 in.; Thorold, 16 in.; Mount Forest, 29 in.; Cowal, 18 in.; Huntsville, 40 in.; Wiarton, 24 in.; Midland, 42 in.; Sunshine, 30 in.; Denbigh, 43 in.; Princeton, 21 in.; Georgetown, 25 in.; Orangeville, 36 in.; Scarboro', 20 in.; Aurora, 15 in.; Goderich, 34 in.; Oliver's Ferry, 15 in.; Ennismore, 20 in.; Fergus, 20 in.; Lyons, 15 in.; Thompson, 22 in.; Presqu'Isle, 27 in.; Thedford, 17 in.; Glastonbury, 21 in.; Dealtown, 12 in.; Burk's Falls, 35 in.; Deer Park, 15 in.; Calvin, 22 in.; Barclay, 16 in.; Uplands, 44 in.; Haileybury, 34 in.; Shannonville, 23 in.; Minden, 34 in.; Egremont, 23 in.; Sprucedale, 39 in.; Whiteside, 53 in.; Owen Sound, 42 in.; Chappleau, 36 in.; Nipigon, 15 in.; Savanne, 18 in.; Biscotasing, 36 in.; Cartier, 30 in.; Schreiber, 32 in.; Sudbury, 42 in.; Heron Bay, 25 in.; Orillia, 32 in.; St. George, 18 in.; Peterborough, 28 in.; Haliburton, 26 in.; Norwood, 35 in.; Paris, 21 in.; Lakefield, 29 in.; Gravenhurst, 34 in.; Galt, 18 in.; Elora, 16 in.; Sault Ste. Marie, 49 in.; Mattawa, 25 in.; Welland, 26 in.; Clontarf, 47 in.; Niagara Falls S., 21 in.; St. Mary's, 36 in.; Chatham, 15 in.; Stony Creek, 19 in.; Georgina, 15 in.; Bognor, 48 in.; DeCewsville, 22 in.; Cottam, 17 in.; Lucknow, 47 in.; Ridgetown, 15 in.; Birnam, 24 in.; Port Rowan, 16 in.; Point Clark, 27 in.; Beatrice, 68 in.; North Bruce, 20 in.; Alton, 23 in.; Conestogo, 21 in.; Bancroft, 64 in.

QUEBEC.—Montreal, 40 in.; Quebec, 50 in.; Cape Magdalen, 43 in.; Pont des Monts, 64 in.; Richmond, 34 in.; Chicoutimi, 34 in.; St. Hyacinthe, 31 in.; Father Point, 45 in.

NEW BRUNSWICK.—Bathurst, 55 in.; St. Andrews, 41 in.; Chatham, 41 in.; St. John, 30 in.; Point Escuminac, 43 in.; Parker's Ridge, 47 in.; Dalhousie, 36 in.; Point Lepreaux, 38 in.

NOVA SCOTIA.—Truro, 31 in.; Halifax, 21 in.; Yarmouth, 26 in.; Sydney, 16 in.; Pictou, 36 in.; Digby, 16 in.

PRINCE EDWARD ISLAND.—Charlottetown, 43 in.; Kilmahumaig, 53 in.; Georgetown, 19 in.

NEWFOUNDLAND.—Channell, 33 in.; St. Johns, 20 in.

*Snowfall 4 in. and upwards in 24 hours:—*

1. Beatrice, 5 in.; Lucknow, 8 in.; Goderich, 4 in.; Uplands, 4 in.; Whiteside, 5 in.; Loch Erroch, 5 in.; Sault Ste Marie, 4 in.; Midland, 4 in.; Sunshine, 4 in.; North Bruce, 5 in.; Glacier, 6 in.; Enderby, 5 in.; Fredericton, 5 in.; Saugeen, 6 in.

2. Lyons, 4 in.; Dealtown, 9 in.; Lucknow, 4 in.; Bognor, 4 in.; Niagara Falls, S., 4 in.; Stratford, 4 in.; Denbigh, 8 in.; Kilmahumaig, 4 in.; Point le Preaux, 4 in.; Glacier, 10 in.

3. Stuart's Lake, 6 in.; Elora, 6 in.; Port Rowan, 6 in.; Birnam, 6 in.; Sarnia, 5 in.; Ennismore, 4 in.; Fergus, 6 in.; Thedford, 4 in.; Glastonbury, 6 in.; Ridgetown, 6 in.; Renfrew, 4 in.; Richmond, 7 in.; Point des Monts, 17 in.; Point le Preaux, 4 in.; Egremont, 6 in.; Conestoga, 6 in.;

Port Stanley, 7 in.; Kingston, 6 in.; Quebec, 6 in.; Port Dover, 8 in.; Woodstock, 8 in.; Toronto, 6 in.; Bancroft, 16 in.; Barkerville, 4 in.; Fredericton, 5 in.; London, 6 in.; Deseronto, 7 in.; Montreal, 10 in.; Guelph, 5 in.; Ottawa, 5 in.; Alexandria, 11 in.; Coldwater, 5 in.; Lindsay, 8 in.; Cottam, 8 in.; DeCewsville, 5 in.; Bognor, 4 in.; Stony Creek, 4 in.; Chatham, 8 in.; Blenheim, 9 in.; Mount Forest, 5 in.; Cowal, 9 in.; Thorold, 6 in.; Wyoming, 6 in.; St. Mary's, 8 in.; Niagara Falls, S., 5 in.; Clontarf, 5 in.; Welland, 16 in.; Scarboro', 5 in.; Glacier, 9 in.; Peterborough, 8 in.; Norwood, 13 in.; Point Escuminac, 5 in.; St. Hyacinthe, 10 in.; St. George, 5 in.; Aurora, 6 in.; Galt, 7 in.; Princeton, 10 in.; Georgetown, Ont., 9 in.; Wilton Grove, 6 in.; Pictou, 6 in.

4. Point Clark, 6 in.; Deer Park, 6 in.; Thompson, 8 in.; Presque Isle, 8 in.; Goderich, 12 in.; Orangeville, 13 in.; Wiarton, 12 in.; Parker's Ridge, 8 in.; Cape Magdalen, 5 in.; St. George, 4 in.; Alton, 10 in.; Glacier, 8 in.; Durham, 12 in.; Bathurst, 7 in.; Father Point, 6 in.

5. Barclay, 4 in.; Paris, 5 in.; Parker's Ridge, 14 in.; Pictou, 4 in.; Digby, 5 in.; Pelce Island, 6 in.; Point le Preaux, 6 in.; St. George, 4 in.; Glacier, 6 in.; Barkerville, 6 in.; White River, 4 in.

6. Sprucedale, 7 in.; Calvin, 4 in.; Point Escuminac, 9 in.; Kilmahumaig, 12 in.; Cape Magdalen, 6 in.; Glacier, 4 in.; Barkerville, 5 in.; Fredericton, 16 in.; Bathurst, 10 in.; Chatham, 13 in.; White River, 5 in.; Charlottetown, 7 in.

7. Beatrice, 9 in.; Burk's Falls, 6 in.; Lucknow, 6 in.; Uplands, 7 in.; Whiteside, 11 in.; Haileybury, 4 in.; Owen Sound, 11 in.; Midland, 4 in.; Huntsville, 6 in.; Saskatoon, 4 in.; Glacier, 8 in.; Parry Sound, 5 in.; Saugeen, 4 in.; Minnedosa, 4 in.; Edmonton, 4 in.

8. Beatrice, 8 in.; Sault Ste Marie, 8 in.; Schreiber, 8 in.; Glacier, 5 in.; Barkerville, 4 in.; Coldwater, 4 in.

9. Beatrice, 5 in.; Thompson, 11 in.; Chapleau, 9 in.; Heron Bay, 5 in.; Sault Ste Marie, 4 in.; Schreiber, 4 in.; Point des Monts, 5 in.; Glacier, 6 in.; Coldwater, 6 in.; White River, 4 in.; Edmonton, 4 in.

10. Beatrice, 4 in.; Sault Ste Marie, 8 in.; Denbigh, 6 in.; Dalhousie, 5 in.; Glenbow, 6 in.; Point des Monts, 11 in.; Glacier, 8 in.; Durham, 6 in.; Coldwater, 4 in.; Quebec, 6 in.; Father Point, 4 in.; Medicine Hat, 5 in.; Calgary, 5 in.

11. Posen, 7 in.; Beatrice, 11 in.; Presque Isle, 6 in.; Bognor, 4 in.; Stony Creek, 4 in.; Galt, 4 in.; Denbigh, 7 in.; Peterborough, 4 in.; Rapid City, 6 in.; Conestogo, 4 in.; Durham, 6 in.; Saugeen, 4 in.

12. Thedford, 4 in.; Sprucedale, 5 in.; Goderich, 4 in.; Windsor, 8 in.; Owen Sound, 4 in.; Orangeville, 8 in.; Scarboro', 5 in.; Wiarton, 4 in.; Haliburton, 4 in.; Rapid City, 4 in.; Pictou, 7 in.; Digby, 5 in.; Richmond, 6 in.; Alton, 5 in.; Bancroft, 5 in.; Rivers Inlet, 14 in.; Donald, 7 in.; Grand Manan, 4 in.; Montreal, 4 in.; Pilot Bay, 4 in.; Ottawa, 4 in.; Alexandria, 8 in.; Truro, 5 in.; Parry Sound, 6 in.

13. Beatrice, 6 in.; Point Clark, 6 in.; Bognor, 4 in.; Schreiber, 6 in.; Kilmahumaig, 4 in.; Rivers Inlet, 6 in.; Abbotsford, 4 in.; Princeton, 5 in.; Coldwater, 5 in.; Yarmouth, 5 in.

14. Stony Creek, 4 in.; St. Mary's, 4 in.; Heron Bay, 4 in.; Savanne, 6 in.; Waterford, 4 in.; Huntsville, 11 in.; Schreiber, 4 in.; Conestogo, 4 in.; Agassiz, 4 in.; Pilot Bay, 4 in.; Quesnelle, 9 in.; Port Simpson, 6 in.; Port Dover, 4 in.; Woodstock, 4 in.

15. Stuart's Lake, 12 in.; Oliver's Ferry, 12 in.; Ennismore, 5 in.; Sprucedale, 12 in.; Windsor, 9 in.; DeCewsville, 6 in.; Bognor, 5 in.; Clontarf, 12 in.; Owen Sound, 5 in.; Shannonville, 12 in.; Wiarton, 6 in.; Midland, 8 in.; Denbigh, 9 in.; Gravenhurst, 6 in.; Orillia, 7 in.; Ottawa, 5 in.; Alexandria, 6 in.; Coldwater, 9 in.; Lindsay, 9 in.; Kingston, 6 in.; Paris, 4 in.; Peterborough, 6 in.; Haliburton, 4 in.; Norwood, 9 in.; St. Hyacinthe, 7 in.; Parry Sound, 9 in.; Pictou, 6 in.; Bancroft, 19 in.; Glacier, 11 in.; Quesnelle, 5 in.; Deseronto, 5 in.

16. Beatrice, 6 in.; Burk's Falls, 10 in.; Bloomingdale, 24 in.; Uplands, 8 in.; Whiteside, 8 in.; Haileybury, 6 in.; Clontarf, 15 in.; Mattawa, 7 in.; Huntsville, 4 in.; Lakefield, 7 in.; Point Escuminac, 7 in.; Parker's Ridge, 8 in.; Kilmahumaig, 6 in.; Richmond, 5 in.; Chatham, 8 in.; Montreal, 5 in.; Cartier, 8 in.; Point des Monts, 8 in.; Point le Preaux, 8 in.; Sudbury, 6 in.; Bathurst, 8 in.; Ottawa, 11 in.; Alexandria, 8 in.; Rockliffe, 8 in.; Quebec, 12 in.; Father Point, 5 in.

17. Channel Island, 4 in.; Dalhousie, 13 in.; Sudbury, 6 in.; Fredericton 5 in.; Bathurst, 12 in.; Father Point, 7 in.

18. Point Clark, 12 in.; Ennismore, 4 in.; Glastonbury, 12 in.; Goderich, 5 in.; Windsor, 4 in.; Welland, 4 in.; Nepigon, 4 in.; Sault Ste Marie, 6 in.; Savanne, 7 in.; Shannonville, 6 in.; Cartier, 4 in.;

Sudbury, 30 in.; Bancroft, 4 in.; Ottawa, 4 in.; Coldwater, 5 in.; Port Stanley, 6 in.; Parry Sound, 9 in.; Port Arthur, 5 in.

19. Beatrice, 5 in.; Lyons, 6 in.; Lucknow, 5 in.; Windsor, 5 in.; St. Mary's, 4 in.; Whiteside, 6 in.; Orangeville, 9 in.; Princeton, 5 in.; Midland, 6 in.; Mount Forest, 4 in.; Paris, 4 in.; Peterborough, 6 in.; Norwood, 6 in.; Point Escuminac, 5 in.; Dalhousie, 5 in.; Bancroft, 6 in.; Parker's Ridge, 5 in.; Kilmahumag, 5 in.; Point des Monts, 4 in.; St. George, 4 in.; Fredericton, 4 in.; Stratford, 4 in.; Durham, 6 in.; Bathurst, 12 in.; Guelph, 9 in.; Lindsay, 6 in.; Parry Sound, 7 in.; Montreal, 4 in.

20. Fergus, 5 in.; Lucknow, 4 in.; Denbigh, 5 in.; Richmond, 4 in.; Cape Magdalen, 12 in.; Enderby, 5 in.; Father Point, 5 in.

21. Presqu'Isle, 6 in.; Point des Monts, 4 in.; Chicoutimi, 7 in.; Glacier, 10 in.; Quebec, 6 in.

22. Glacier, 5 in.; Barkerville, 6 in.

23. Haileybury, 5 in.; Point Escuminac, 4 in.; Parker's Ridge, 4 in.; Schreiber, 6 in.; Kilmahumag, 8 in.; Point le Preaux, 6 in.; Quebec, 6 in.; Charlottetown, 5 in.

24. Chapleau, 6 in.; Pictou, 4 in.

25. St. John's, Nfld., 4 in.

26. Georgetown, P.E.I., 4 in.; Cape Magdalen, 6 in.; Charlottetown, 4 in.

27. Chapleau, 4 in.; Kilmahumag, 10 in.; Salmon Arm, 4 in.; St. Johns, Nfld., 6 in.

28. Chapleau, 6 in.; Glacier, 6 in.; Barkerville, 7 in.; Ottawa, 5 in.; Alexandria, 5 in.; Coldwater, 5 in.; Edmonton, 4 in.

29. Whiteside, 4 in.; St. Johns, Nfld., 10 in.; Edmonton, 5 in.

30. Point Escuminac, 4 in.; Point le Preaux, 4 in.; Glacier, 7 in.

31. Edmonton, 6 in.; Hillview, 4 in.; Presqu'Isle, 4 in.; Whitehead, 4 in.; Saskatoon, 6 in.; Glacier, 9 in.; Durham, 4 in.; Fergus, 4 in.; Parry Sound, 6 in.; Yarmouth, 4 in.; Grand Manan, 4 in.; Sydney, 6 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Savanne.

2. Savanne, Haileybury, IV; Channel Island, IV.

3. Savanne.

4. Channel Island, Alexandria, II.

5. Hillview, Prince Albert, II.

7. Hillview.

8. Savanne, Minnedosa, IV.

9. Channel Island, Hillview.

10. Savanne, Minnedosa, III.

11. Channel Island, Hillview.

12. Chicoutimi, IV; Savanne, Posen.

13. Haileybury, III.

14. Posen.

16. Channel Island.

24. Channell, II; Wallace, II.

26. Wallace, III; Minnedosa, IV; Prince Albert, I.

27. Egremont, IV; Savanne, Clontarf, IV; Elora, Channel Island.

28. Savanne, Burk's Falls, Channel Island.

29. Alton, II; Huntsville, II; Gravenhurst, III; Georgetown, Ont., IV; Savanne, Mattawa, Clontarf, IV; Haileybury, II; Stony Creek, IV; Georgina, Uplands, Calvin, Birnam, IV; Elora, Channel Island, Ottawa, III; Alexandria, I; Coldwater, II; Toronto, IV.

31. Savanne.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF DECEMBER, 1933.

	HOURS ENDING															
	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	NOON	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	
ESQUIMALT.....				0 00	0 01	0 09	0 16	0 19	0 18	0 25	0 22	0 02	0 00			
AGASSIZ, R.C.....				00	00	07	07	16	18	16	15	06	00			
BRANDON.....				00	07	35	41	45	43	43	27	14	00			
INDIAN HEAD.....				00	00	08	19	24	27	24	17	03	02			
WINNIPEG.....				17	37	48	50	50	37	44	08	00	00			
WOODSTOCK.....				00	00	03	13	25	28	23	19	17	06			
TORONTO.....				03	22	33	34	41	35	32	24	13	00			
LINDSAY.....				01	13	19	23	25	24	25	23	14	05			
BARRIE.....				8	11	22	22	18	21	23	17	09	00			
KINGSTON.....				01	20	24	29	27	33	35	31	21	01			
MONTREAL.....				00	13	28	33	40	36	37	41	29	00			
FREDERICTON.....				00	16	25	29	34	33	31	29	24	00			
MEAN PROPORTION FOR MONTH.....				0 13	0 09	0 31	0 15	0 38	0 15	0 27	0 19	0 16	0 24	0 34	0 25	
<i>(Construct sunshine being 1.)</i>																
MAXIMUM DAILY AMOUNT.....				0 67	0 72	0 80	0 68	0 90	0 69	0 88	0 97	0 74	0 92	0 90	0 91	
DATE.....				0 26	26	23	12	23	4	26	4	4	4	4	22	
NO. OF DAYS COMPLETELY CLOUDED.....				15	22	9	17	9	18	12	14	14	15	13	18	

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 665. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA.....	101	63	23	15	73.8
LOWER LAKE REGION.....	119	87	16	16	79.8
UPPER ST. LAWRENCE.....	115	87	21	7	84.8
LOWER ST. LAWRENCE.....	111	80	11	11	85.1
GULF.....	106	85	12	9	85.8
MARITIME PROVINCES.....	113	79	20	14	78.8
TOTAL.....	665	490	103	72	81.4

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at the "Probability Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer H. V. Payne.

STORM WARNINGS.

During the month warnings on the approach of six storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued

was 159, of which 131 or 81.1 per cent were verified. At 3 stations, however, the force exceeded, and at 8 did not reach that indicated by the signals displayed; 33 stations reported warnings received late, owing to delay in issue and transmission.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 131 warnings verified as to force 93, or 71.0 per cent, were fully verified, and 131, or 100 per cent., were fully and partially verified.

1. At 11.30 a.m. 2nd, in advance of a storm then over Kansas and Colorado, signals indicating a heavy easterly veering to south-westerly gale were ordered for all Lake Stations. A moderate to fresh easterly to northerly gale prevailed that night and during the forenoon of the 3rd on the Lower Lakes, but on Superior the weather continued fine. Signals were lowered at stations on the Lower Lakes on forenoon of 4th and Superior on afternoon of 5th. The storm centre above mentioned passed to the southward of Lakes Erie and Ontario, thence eastward and at 4.15 p.m. of 3rd, as it was approaching New England, signal No. 3 indicating a heavy gale at first easterly was ordered for our Maritime Stations. A fresh to heavy gale blew during the night at all stations and was followed next forenoon by strong south-westerly winds as the storm passed across the Gulf. Signals were lowered on afternoon of the 4th.

2. At 10.20 p.m. of the 4th, owing to a depression near Lake Superior, stations on Lakes Huron and Erie were warned of a moderate south-east to south-west gale. Strong winds and moderate gales were generally prevalent next day on the Lakes. Presqu'isle reported S.W. 45 from 6 to 11 a.m. of 5th, and Goderich S. 36. Signals were lowered on afternoon of 5th by which time the storm had almost entirely dispersed.

3. During the 5th there was a storm moving north-eastward near the Atlantic Coast; at 8 p.m. the centre was south-east of Nantucket, and at 10.07 storm signals indicating a heavy east shifting to north and north-west gale was ordered for our Maritime Stations. The centre passed over Cape Breton during forenoon of the 6th and thence north-eastward. A moderate to fresh north-easterly gale blew in the Bay of Fundy and in the Gulf during the night of 8th while in Eastern Nova Scotia there was a heavy south-east gale veering to south-west next morning. Safety telegrams were despatched at 11 a.m. 6th.

4. During the forenoon of the 9th there was a depression developing over the Upper Mississippi Valley, and at 11.15 a.m. signals indicating a heavy southerly shifting to westerly gale were ordered for all Lake Stations still open to navigation. The storm centre moved across the northern portions of Lakes Michigan and Huron and thence eastward. A heavy westerly to north-westerly gale blew from early morning of the 10th until night. Signals were lowered during evening of the 10th. On account of this same storm at 10.05 p.m. 9th signal No. 1 for a moderate gale at first easterly was ordered for all stations in the Maritime Provinces. At 10 a.m. 10th a change to signal No. 2 was made in the Bay of Fundy and on the Atlantic Coast, and to No. 3 in the Gulf. At most points the gale did not begin until the 11th, but on that day there was a general moderate to fresh gale from the north-west. N.W. 37 was recorded at Yarmouth. W. 44 at Low Point, C.B., and N.W. 48 at Point Escuminac, N.B. Signals were lowered on afternoon of the 11th.

5. At 11 p.m. 11th, owing to a depression then in Southern Michigan, signal No. 3 indicating a gale at first easterly was ordered for all Maritime Stations. The storm centre subsequently passed near the Nova Scotian Coast but there was no gale. Signals were lowered on the 12th.

6. At 10.10 p.m. 15th signal No. 1 for a moderate gale at first easterly was ordered for Maritime Stations, this owing to a storm moving across the Lake Region with increasing energy. A moderate to fresh easterly gale with snow and rain prevailed during the 16th at all stations warned. Safety telegrams were despatched at 10.15 p.m. 16th.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR DECEMBER, 1893.

The first day was very steady with the exception of a little irregularity between 10 and 11 p.m. The 2nd was exceptionally quiet and the same may be said of the following two days. Slight disturbance appeared on the morning of the 5th and became more marked after 6 a.m., the declination magnet then moving gradually west, a marked maximum being recorded at 7.10 a.m., it then gradually resumed its normal position. This movement was accompanied at first by a decrease of both components of the force, and then by an increase. During the afternoon of the 5th a slight disturbance prevailed, and a little previous to the 6 p.m. observation a marked easterly change of the declination

needle began, the minimum taking place at 8.46 p.m., it then moved west and at 10 p.m. was quiet, and continued so up to the evening of the 8th when a few irregular changes occurred. A steady magnet prevailed from the 9th to the 23rd. In fact it was the longest quiet period we have had for some time. On the 24th a slight disturbance appeared and shewed a more active tendency between 6 and 8 p.m. For 5 hours the curve was regular and after 1 a.m. a slight disturbing action began but passed off at 10 a.m. and appeared again on the early morning hours of the 27th, 28th and 29th. After 8 p.m. of the latter date an increase of the movements began lasting for a brief period, and slight irregularities were observed until noon of the 30th when a steady magnet set in and continued to the end of the month. In fact the month has been the quietest on record for some time.

Auroral light class (IV) was observed on the 29th. On the 1st, 3rd, 7th, 8th, 10th, 12th, 17th, 20th and 27th it was possible to see aurora, but none was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

CHARLES CARPMAEL,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, April, 1894.



## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

JANUARY, 1894.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The pressure was generally above its normal value east of the Mississippi Valley and as much as  $+10$  inches in the north-eastern portion of the Province of Quebec, whilst in the other parts of the continent except in California and especially along the coast where it was  $+0.50$  inches, it did not come up to its average, the greatest departures being  $-0.80$  inches in Western Colorado, and also a like amount in Western Alberta. Eleven low pressure areas were traced and their mean rate of travel was  $34.5$  miles per hour, four of the areas travelled from the south-west States, one passed up the Atlantic, and the others came from the North Pacific Ocean.

The morning of the 1st began with shallow depressions covering the North-west and the North Pacific States, and with comparatively high pressure elsewhere, the highest pressure being situated over the Ottawa Valley. Snow was falling pretty generally from the Rockies to Lake Superior and in other parts of Canada the weather was fair.

The depressions moved slowly to the Lake Region and down the St. Lawrence Valley and between the 2nd and 4th snow fell heavily in the St. Lawrence districts, and there were moderate falls of sleet or rain in the Lake Region and the Maritime Provinces. On the 5th, the passage of a shallow depression to the southward of the Lower Lakes and the Maritime Provinces gave a fall of rain or snow in Ontario and snow along the Nova Scotian coast; another minor depression which passed into the Lake Region from the southward was attended by a moderate snowfall as far as the Ottawa Valley on the 6th and in the Maritime Provinces on the 7th.

The 2nd was a fine cold day in the North-west Territories, then between the 3rd and 4th during the passage of a shallow depression there were some light local snowfalls. Anti-cyclonic conditions afterwards set in and lasted until the night of the 8th, accompanied by fine and decidedly cold weather, minima between  $30^{\circ}$  and  $40^{\circ}$  below zero being almost of daily occurrence.

The high pressure spread over the Lake Region and Eastern Canada in rear of the series of shallow depressions and gave some fine wintry days lasting until the 10th and 11th respectively. No very low temperatures were recorded during the interval except in the Gulf of St. Lawrence, where Father Pt. registered  $-24^{\circ}$  and Chatham  $-32^{\circ}$ .

A deep disturbance which passed into Alberta from the north-westward on the 9th, drew strong winds and gales from the south and west as far as Manitoba until the 10th, and the weather became quite mild. On the 11th, with its energy somewhat reduced, it travelled over the Lake Region giving strong winds and gales as well as light local sleet or snow. Along the St. Lawrence and in the Maritime Provinces snow fell generally and in many places quite heavily, and during the 12th, when the disturbance was situated on the Nova Scotian coast it either redeveloped great energy or else was reinforced by another disturbance from the Atlantic, for at night a very severe storm was

situated off the Cape Breton coast, and a heavy gale from the north and north-west was blowing throughout the Maritime Provinces and it extended as far as the Province of Quebec.

A series of depressions usually of feeble energy now travelled from the British Columbia coast, and as a rule made their influence felt in all parts of Canada by the mild weather which accompanied them as well as by the sleet and rain that they brought.

An important high pressure area which passed down from the northward on the 16th, gave fine weather from the Lakes to the Atlantic, together with much lower temperature in Quebec and the Maritime Provinces. It however soon gave way before the advance of another shallow depression from the westward, which brought on the 18th light rain pretty generally from the Lakes to the Atlantic.

Anti-cyclonic conditions were again pronounced in all portions of Canada between the 19th and 20th, and some low temperatures were recorded in the North-west Territories and along the St. Lawrence Valley.

A moderate disturbance which was in the South-west States on the 19th, travelled over the Lake Region and down the St. Lawrence Valley on the 21st, accompanied by showers. On the preceding day, apparently owing to its influence, a moderate snowfall occurred from the Rockies to Manitoba.

The last ten days of the month saw some decided movements of high and low pressure areas. In the North-west Territories and Manitoba the distribution of pressure was largely anti-cyclonic, but in other portions of Canada it was more evenly divided between anti-cyclonic and cyclonic owing to the passage of a series of depressions, the two most important of the number being the one from the South-west States which made its influence felt between the 23rd and 24th, and the second one which was of great energy, which developed and moved up the Atlantic, the barometer in its centre when over the Bay of Fundy reading 28.60 inches reduced to sea level. During this protracted interval the temperature as a rule was extremely low in the Territories and Manitoba and the pressure very high. On the morning of the 23rd, the reduced barometer in Alberta was 31.26 inches and the temperature from the Rockies to Manitoba ranged from  $-30^{\circ}$  to  $-40^{\circ}$ . On the 24th, Prince Albert recorded  $-47^{\circ}$ , and Winnipeg  $-40^{\circ}$ ; again on the 26th, these stations registered  $-46^{\circ}$  and  $-40^{\circ}$  respectively. Light falls of snow occurred between the 28th and 29th, and at other times the weather was fine.

Snow or rain, chiefly the latter, fell from the Lakes to the Atlantic on the 24th, and strong breezes and gales prevailed. There were light local snowfalls in Ontario and Quebec between the 26th and 27th, and on the latter date there was also a fairly heavy snowfall along the Nova Scotian coast attended by strong north-easterly to northerly winds.

Between the 29th and 30th during the presence of the severe storm which had developed off the Atlantic coast, snow fell heavily from Ontario to Nova Scotia accompanied by strong winds and gales. In the Maritime Provinces the storm was very severe, and in many places the snowfall was excessive. On the 26th the temperature fell to  $-30^{\circ}$  in the Ottawa Valley, to  $-12^{\circ}$  in Quebec, and to zero in the Maritime Provinces. The 27th and 28th were also fairly cold days, but at other times the temperature was not low.

## TEMPERATURE.

The average temperature in British Columbia and the N. W. Territories was in general under the average; in Ontario and as far east as Quebec it was considerably above, and in the Maritime Provinces slightly below the average.

*The Highest and Lowest Temperatures in each Province during January were :*

British Columbia,  $56^{\circ} 0$  on 21st at Quesnelle;  $-32^{\circ} 5$  on 23rd at Stuart's Lake.

North-west Territories,  $48^{\circ} 2$  on 13th at Medicine Hat;  $-47^{\circ} 5$  on 6th at Saskatoon.

Manitoba,  $37^{\circ} 7$  on 13th at Dauphin;  $-52^{\circ} 0$  on 24th at Oakbank.

Ontario,  $5^{\circ} 7$  on 21st at Owen Sound, and on 4th at Stony Creek;  $-54^{\circ} 5$  on 14th at White River.

Quebec,  $42^{\circ} 0$  on 25th at Richmond;  $-43^{\circ} 0$  on 10th at Chicoutimi.

New Brunswick,  $47^{\circ} 8$  on 25th at Fredericton;  $-32^{\circ} 5$  on 10th at Chatham.

Nova Scotia,  $47^{\circ} 5$  on 25th at Sydney;  $-9^{\circ} 9$  on 18th at Sydney.

Prince Edward Island,  $43^{\circ} 9$  on 25th at Charlottetown;  $-9^{\circ} 0$  on 10th at Charlottetown.







## PRECIPITATION.

The rainfall throughout the Dominion, with the exception of British Columbia, has been considerably below the average quantity.

*The general distribution is as follows :*

In BRITISH COLUMBIA the rainfall on the coast varied from 9 in. at Rivers Inlet to 4 in at Port Simpson. In the interior little has fallen.

In the NORTH-WEST TERRITORIES rain only reported from one station (Banff).

In MANITOBA no rain is recorded except some light rain on the 16th.

In ONTARIO West and South-west District, it was 0·91 in., or 0·05 in. below the average. In the North and North-west District, it was 0·50 in., or 0·22 in. below the average. In the Central District, it was 1·10 in., or 0·05 in. below the average ; and in the East and North-east District it was 1·11 in., or 0·31 in. above the average.

In QUEBEC it was 0·16 in., or 0·37 in. below the average.

In NEW BRUNSWICK it was 0·79 in., or 0·05 in. below the average.

In NOVA SCOTIA it was 1·04 in., or 1·40 in. below the average.

In PRINCE EDWARD ISLAND it was 0·64 in., or 0·58 in. below the average.

*Rainfall 5 in. and upwards during month :—*

BRITISH COLUMBIA Esquimalt, 6·11 in.; Rivers Inlet, 9·29 in.; Abbotsford, 6·04 in.; Loch Erroch, 6·52 in.; Salt Spring Island, 6·48 in.; French Creek, 5·17 in.; Quamichan, 5·10 in.; Quamichan (2), 8·82 in.; Hazlemere, 7·73 in.; Agassiz, 5·45 in.

BERMUDA, 5·81 in.

*Rainfall 1 inch and upwards in 24 hours : —*

3. Shannonville, 2·00 in.; Port Simpson, 1·88.

9. Rivers Inlet, 1·20 in.; Port Simpson, 1·88 in.

11. Rivers Inlet, 2·15 in.; Hazlemere, 1·45 in.

12. Rivers Inlet, 2·86 in.; Salt Spring Island, 1·90 in.; Quamichan, 2·00 in.; Quamichan (2), 1·77 in.; Loch Erroch, 1·31 in.; Port Simpson, 1·11 in.

13. Rivers Inlet, 1·54 in.; French Creek, 1·22 in.; Quamichan, 1·90 in.; Quamichan (2), 2·57 in.; Loch Erroch, 2·50 in.; Princeton, 2·00 in.; Agassiz, 1·62 in.; Spence's Bridge, 1·41 in.

15. Durham, 1·00 in.

17. Heron Bay, 1·00 in.

19. Mattawa, 1·13 in.

20. Biscotasing, 2·00 in.; Point Clark, 1·30 in.

21. Deseronto, 1·34 in.

21. Channell N.E.L., 1·00 in.

25. Channell N.E.L., 1·00 in.

27. Loch Erroch, 1·18 in.

28. Salt Spring Island, 1·22 in.; Abbotsford, 1·40 in.

29. Quamichan, 1·17 in.

*Snowfall.* In Ontario the snowfall has been below the average, in Quebec the amount equals the normal, in the other provinces the amount has exceeded to a considerable extent the normal.

BRITISH COLUMBIA. Snow has generally been in excess of the usual quantity. At some parts in the eastern district upwards of six feet has been recorded.

N.W. TERRITORIES. About 7 in. has fallen, about 4 in. less than in January, 1893.

MANITOBA. 12 in. has fallen, 4 in. above that of 1893.

In the same DISTRICTS OF ONTARIO, as shown in the rainfall, the amount is 4·2 in. or 12·5 in. below the average ; 3·1 in. or 2·5 in. below the average ; 0·3 in. or 0·1 in. below the average ; 19·4 in. or 0·1 in. below the average.

In QUEBEC 27·0 in., equal to the average.

In NEW BRUNSWICK 28 in., or 40 in. above the average.

In NOVA SCOTIA, 3·77 in., or 12·0 in. below the average.

In PRINCE EDWARD ISLAND, 35·0 in., or 7·8 in. above the average.

*Snowfall 15 inches and upwards during month.*

BRITISH COLUMBIA.—Rivers Inlet, 26 in. ; Abbotsford, 17 in. ; Loch Erroch, 26 in. ; Stuart's Lake, 33 in. ; French Creek, 18 in. ; Glacier, 76 in. ; Donald, 19 in. ; Salmon Arm, 22 in. ; Enderby, 25 in. ; Pilot Bay, 28 in. ; Barkerville, 26 in. ; Agassiz, 59 in. ; Port Simpson, 28 in.

N.-W. TERRITORIES. Pincher Creek, 16 in.

MANITOBA.—Hillview, 21 in. ; Shoal Lake, 21 in. ; Fort Ellice, 15 in.

ONTARIO.—Egremont, 18 in. ; Uplands, 33 in. ; Owen Sound, 38 in. ; Schreiber, 18 in. ; Biscotasing, 15 in. ; Cartier, 23 in. ; Bognor, 30 in. ; Point Clark, 17 in. ; Missanabie, 20 in. ; Lucknow, 21 in. ; Haliburton, 18 in. ; Gravenhurst, 30 in. ; Bancroft, 36 in. ; N. Bruce, 22 in. ; Sault Ste. Marie, 48 in. ; Beatrice, 31 in. ; Orillia, 32 in. ; Calvin, 36 in. ; Georgina, 18 in. ; Mattawa, 22 in. ; Clontarf, 32 in. ; Welland, 17 in. ; Whiteside, 29 in. ; Sprucedale, 18 in. ; Shannonville, 15 in. ; Haileybury, 27 in. ; Coldwater, 55 in. ; Lindsay, 22 in. ; Ottawa, 33 in. ; Parry Sound, 34 in. ; Saugeen, 24 in. ; Kingston, 27 in. ; Rockliffe, 33 in. ; Deseronto, 22 in. ; Midland, 25 in. ; Wiarton, 22 in. ; Presqu'Isle, 26 in. ; Mount Forest, 24 in. ; Sunshine, 16 in. ; Glastonbury, 18 in. ; Denbigh, 27 in. ; Burk's Falls, 32 in. ; Durham, 31 in. ; Barrie, 17 in.

QUEBEC.—Father Point, 27 in. ; Quebec, 37 in. ; Montreal, 19 in. ; Cape Magdalene, 29 in. ; Point des Monts, 52 in. ; Richmond, 19 in.

NEW BRUNSWICK.—Bathurst, 24 in. ; Grand Manan, 19 in. ; St. Andrews, 34 in. ; Chatham, 20 in. ; Fredericton, 23 in. ; Parker's Ridge, 29 in. ; Point Lepreaux, 36 in. ; St. John, 23 in. ; Dalhousie, 36 in. ; Point Escuminac, 33 in.

NOVA SCOTIA.—Halifax, 56 in. ; Yarmouth, 22 in. ; Pictou, 58 in. ; Port Hastings, 28 in. ; Digby, 17 in. ; Whitehead, 41 in.

PRINCE EDWARD ISLAND.—Charlottetown, 31 in. ; Georgetown, 39 in.

NEWFOUNDLAND.—Channell, 54 in. ; St. Johns, 50 in. ; Sandy Point, 64 in.

*Snowfall 4 in. and upwards in 24 hours :—*

1. Sault Ste. Marie, 6 in. ; Channell, N. F. L., 12 in. ; Hillview, 4 in. ; Turtle Mountain, 4 in. ; St. Johns N. F. L., 10 in.

2. Cartier, 6 in. ; Haileybury, 6 in. ; Calvin, 7 in. ; Mattawa, 4 in. ; Sudbury, 4 in. ; Rapid City, 4 in. ; Shoal Lake, 4 in. ; Rockliffe, 5 in.

3. Sault Ste. Marie, 4 in. ; Sudbury, 4 in. ; Point Escuminac, 7 in. ; Agassiz, 4 in. ; Quebec, 5 in. ; Aurora, 4 in. ; Calvin, 5 in. ; Quebec, 7 in.

5. Denbigh, 4 in. ; Norwood, 4 in. ; Georgina, 4 in. ; Owen Sound, 4 in. ; Point Lepreaux, 5 in. ; Salt Spring Island, 6 in. ; Quessnelle, 4 in. ; Kingston, 4 in. ; Grand Manan, 5 in. ; St. Andrews, 5 in. ; Durham, 6 in.

6. Lakefield, 4 in. ; Orillia, 4 in. ; Bancroft, 4 in. ; Hazlemere, 5 in. ; Enderby, 6 in. ; Saugeen, 4 in.

7. Gravenhurst, 10 in. ; Sprucedale, 4 in. ; Fergus, 4 in. ; Presque Isle, 6 in. ; Burk's Falls, 6 in. ; Norwood, 4 in. ; Beatrice, 4 in. ; Whiteside, 5 in. ; Orillia, 4 in. ; Brome, 5 in. ; Agassiz, 9 in.

8. Presqu'Isle, 5 in. ; Whiteside, 6 in. ; Orillia, 4 in. ; Channell, N. F. L., 12 in. ; Enderby, 6 in. ; Port Simpson, 6 in. ; Coldwater, 12 in.

9. Glastonbury, 4 in. ; Rivers Inlet, 7 in. ; Stuart's Lake, 9 in. ; Glacier, 12 in. ; Donald, 8 in. ; Salmon Arm, 5 in. ; Barkerville, 10 in. ; Agassiz, 10 in. ; White River, 4 in.

10. Schreiber, 8 in. ; Glacier, 7 in.

11. Barclay, 4 in. ; Sault Ste. Marie, 6 in. ; Georgina, 6 in. ; Dalhousie, 5 in. ; Point des Monts, 11 in. ; Glacier, 7 in. ; Donald, 6 in. ; Pilot Bay, 11 in. ; Barkerville, 6 in.

12. Mount Forest, 5 in. ; Sault Ste. Marie, 6 in. ; Owen Sound, 6 in. ; Dalhousie, 8 in. ; Point Lepreaux, 15 in. ; Pictou, 30 in. ; Port Hastings, 16 in. ; Parker's Ridge, 6 in. ; Digby, 5 in. ; Glacier, 6 in. ; Bathurst, 12 in. ; Halifax, 16 in. ; Quebec, 5 in. ; St. Andrews, 7 in. ; Father Point, 4 in. ; Yarmouth, 4 in. ; Chatham, 10 in. ; Charlottetown, 7 in. ; Fredericton, 6 in. ; Durham, 6 in. ; Barrie, 4 in.

13. Georgetown (12-13), 34 in. ; Digby, 12 in. ; Whitehead, 24 in. ; Channell, 9 in. ; Cow Bay, 5 in. ; Point Escuminac, 11 in. ; Glacier, 5 in. ; St. Johns, N. F. L., 10 in. ; Charlottetown, 13 in.

14. Pictou, 4 in. ; Cape Magdalen, 15 in. ; Glacier, 4 in.

15. Rivers Inlet, 9 in. ; St. Johns, N. F. L., 6 in.

16. Richmond, 4 in. ; Hillview, 12 in. ; Shoal Lake, 14 in. ; Turtle Mountain, 5 in. ; Brandon, 8 in. ; Brandon (2), 10 in. ; Fort Ellice, 8 in. ; Portage La Prairie, 5 in. ; Alameda, 4 in. ; Loch Erroch, 4 in. ; Minnedosa, 4 in.

17. Rapid City, 10 in.; French Creek, 4 in.; Minnedosa, 6 in.; St. Johns, N.F.L., 6 in.
18. French Creek, 4 in.; Quamichan, 4 in.; Loch Erroch, 6 in.
19. Barclay, 4 in.
20. Missanabie, 4 in.; Savanne, 5 in.; Nepigon, 4 in.; Heron Bay, 4 in.; Fort Francis, 4 in.; Chicoutimi, 4 in.; Port Arthur, 4 in.; Winnipeg, 4 in.
21. Schreiber, 6 in.; Bancroft, 4 in.; Rivers Inlet, 9 in.
23. Midland, 8 in.; Burk's Falls, 6 in.; Mattawa, 7 in.; Uplands, 5 in.; Salt Spring Island, 4 in.; Quamichan, 7 in.; Abbotsford, 6 in.; Agassiz, 5 in.
24. Gravenhurst, 5 in.; Sprucedale, 8 in.; Mount Forest, 4 in.; Presque Isle, 12 in.; Wiarton, 11 in.; Goderich, 8 in.; Lucknow, 4 in.; Point Clark, 14 in.; Bognor, 12 in.; North Bruce, 6 in.; Agassiz, 13 in.; Coldwater, 3 in.; Parry Sound, 10 in.; Saugeen, 7 in.; Rockliffe, 10 in.; Durham, 4 in.; Beatrice, 6 in.; Whiteside, 6 in.; Spence, 6 in.; Calvin, 11 in.; Owen Sound, 14 in.; Upland, 6 in.; Dalhousie, 4 in.; Point des Monts, 7 in.; Egremont, 5 in.; Salmon Arm, 6 in.
25. Huntsville, 6 in.; Burk's Falls, 5 in.; Haileybury, 4 in.; North Bruce, 4 in.; Pictou, 9 in.; Salmon Arm, 4 in.; Loch Erroch, 6 in.; Princeton, 4 in.; Durham, 4 in.
26. Enderby, 6 in.; Pilot Bay, 6 in.; Quesnelle, 8 in.
27. Presqu'Isle, 6 in.; Midland, 6 in.; Whiteside, 4 in.; Orillia, 4 in.; St. Hyacinthe, 4 in.; Cow Bay, 4 in.; Portage La Prairie, 5 in.; Glacier, 10 in.; Salmon Arm, 4 in.; Baskerville, 10 in.; Halifax, 5 in.; Yarmouth, 7 in.; Sydney, 6 in.
28. Sault Ste. Marie, 4 in.; Whitehead, 11 in.; Coldwater, 12 in.; St. Johns, N.F.L., 4 in.
29. Stony Creek, 6 in.; Gravenhurst, 5 in.; Sprucedale, 5 in.; Thorold, 6 in.; Aurora, 6 in.; Deer Park, 4 in.; Ennismore, 6 in.; Scarborough, 4 in.; Haliburton, 12 in.; Virgil, 5 in.; White River, 4 in.; Kingston, 4 in.; Minnedosa, 4 in.; Father Point, 7 in.; Fredericton, 5 in.; Toronto, 5 in.; Deseronto, 13 in.; Missanabie, 4 in.; Shannonyville, 12 in.; Sault Ste. Marie, 4 in.; Beatrice, 4 in.; Lakefield, 8 in.; Whiteside, 4 in.; Orillia, 5 in.; Calvin, 4 in.; Georgina, 6 in.; Renfrew (20-30), 13 in.; Ottawa, 22 in.; Hillview, 4 in.; Mission Valley, 4 in.; Nicola Lake, 4 in.; Fort Steele, 6 in.; Lindsay, 10 in.
30. Denbigh, 16 in.; Glastonbury, 14 in.; Huntsville, 6 in.; Oliver's Ferry, 12 in.; Burk's Falls, 7 in.; Peterborough, 5 in.; DeCewsville, 4 in.; Niagara Falls, 8 in.; Sault Ste. Marie, 4 in.; Calvin, 4 in.; Mattawa, 5 in.; Clontarf, 22 in.; Uplands, 5 in.; Dalhousie, 11 in.; Point Lepreaux, 12 in.; Pictou, 6 in.; Parker's Ridge, 12 in.; Chicoutimi, 6 in.; Richmond, 6 in.; Kingston, 13 in.; Point des Monts, 30 in.; Egremont, 4 in.; Channell, 18 in.; Bancroft, 16 in.; Point Escuminac, 10 in.; Bathurst, 8 in.; Halifax, 24 in.; Quebec, 11 in.; Rockliffe, 7 in.; St. Johns, N.F.L., 10 in.; St. Andrews, 12 in.; Yarmouth, 6 in.; Chatham, 5 in.; Fredericton, 7 in.; Montreal, 8 in.
31. Mount Forest, 4 in.; Durham, 6 in.

*Aurora recorded*

Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (II), the feeblest in brilliancy.

1. Alameda, II; Dauphin, Henrietta III.
2. Stony Creek, II; Gravenhurst, IV; Georgetown, IV; Midland, IV; Alton, III; Georgina, Welland, Alameda, II; St. Albans, III; Dauphin.
3. Georgetown, IV; Peterborough, II; Haliburton, IV; Savanne, Alton, II; Alameda, III; St. Albans, I; Dauphin, Hillview, Shoal Lake, *brilliant*. Channel Island, IV; Emerson, III; Port Simpson, II; Port Arthur, II; Kingston, III; Minnedosa, III; Winnipeg, II; Deseronto, II.
4. Haileybury IV; Savanne, Dauphin, Brandon, I; Henrietta, I.
5. Gravenhurst, IV; Haileybury IV; Cape Chatte, St. Albans IV; Portage la Prairie, I; Minnedosa, III.
6. Pembina Crossing, IV; Fort Ellice, I; Portage la Prairie, III.
7. Burk's Falls, IV; Haileybury, IV; Pembina Crossing, IV; White River, III; Kingston, I.
8. Savanne.
10. Prince Albert, II;
11. Georgetown, IV; Burk's Falls, IV; Savanne, Calvin, Alameda, I; St. Albans, III; Pembina Crossing, III; Kingston, III; Prince Albert, I; Toronto, IV; Barrie, III.
12. Kingston, III.
3. Savanne, Channel Island, IV.
19. White River, III.



- PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF JANUARY, 1894.

	ESQUIMALT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LENDRAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.25	0.32	0.45	0.57	0.40	0.29	0.32	0.23	0.20	0.36	0.45	0.40
MAXIMUM DAILY AMOUNT.....	0.79	0.73	0.94	0.86	0.93	0.82	0.91	0.96	0.86	0.91	1.00	0.90
DATE.....	2	2	28	19	10	14	8	19	18	12	13	14
NO. OF DAYS COMPLETELY CLOUDED.....	10	5	6	13	7	13	8	11	10	9	10	12

The number of predictions issued during the month was 593. These were divided as follows:—

9

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the observers at all "Observing Stations," as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer B. C. Webber.

### STORM WARNINGS

During the month, warnings on the approach of five storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 68, of which 51, or 75 per cent, were verified. At 7 stations, however, the force did not reach that indicated by the signals, and 6 stations reports warnings late owing to delay in issue.

In connections with the warnings, predictions as to the probable directions of the wind were given, and of the 51 warnings verified as to force, all were fully verified as to direction.

No. 1. At 10 a.m. on the 12th, all stations in the Gulf of St. Lawrence and Maritime provinces, open to navigation, were warned to expect a strong gale from the west and north-west at the time a developing depression was over Nova Scotia, which as it passed northeastward to Newfoundland developed great energy. A fresh to heavy gale from the north and north-west occurred at most places during the 12th and 13th, although at a few places it came from the east and north-east. Halifax reported "hard northerly gale and heavy drifting snow," Pictou, "A fall of four feet of snow," "Glace Bay heavy sea and very high tide," "and Ingonish a hurricane on the 12th from south-east and north-east with very high tide, doing very much damage on shore." At Sydney the barometer fell to 28.28 in.; reduced to M. S. L. and the snow fall was heavy throughout the greater portion of Nova Scotia.

No. 2. In consequence of the reports from Bermuda showing a northerly gale on the morning of the 19th, all Nova Scotian and Prince Edward Island stations were warned at 11.25 a. m., to expect a strong easterly gale. The cyclone however passed too far off the coast to cause any storm in the districts warned.

No. 3. All stations in the Bay of Fundy and north-eastward along the Atlantic Coast as far as the Gut of Canso, were warned on the 24th, for a moderate easterly gale, in advance of a cyclone then over the Lower Lake district moving north-eastward. As it passed over the Gulf of St. Lawrence next day, it caused a moderate south-east to south-west storm in the district warned.

No. 4. At 10 p. m. on the 26th, stations in the Bay of Fundy and north-east along the Nova Scotian coast were warned for a moderate east to north and north-west gale. Next morning these signals were changed to No. 3. for a strong easterly gale, as a cyclone which was moving up off the Atlantic Coast showed considerable development. During the day it passed to the eastward of Nova Scotia causing a moderate to fresh north-easterly gale at most stations warned.

No. 5. On the morning of the 29th, there were two depressions shown, one central over Lake Michigan and the other off the coast, of Carolina. Signals for a strong gale were ordered for all Bay of Fundy and Atlantic Coast stations. By night the storm over Lake Michigan had been absorbed by the other, which next morning was off the coast of Maine and had developed considerable energy. During the 30th, a heavy gale from the north-east and south-east occurred throughout the Maritime Provinces continuing at most places during the 31st, when the wind changed to the westward. By night the storm had passed north-eastward over Newfoundland.

### TORONTO OBSERVATORY MAGNETIC REVIEW FOR JANUARY, 1894.

The first day was free from disturbance, as was also the 2nd up to 9.30 p.m., when a slight disturbance appeared, lasting about three hours. It reappeared again after 5 a.m. and assumed a more important character after 7 p.m. From 8 p.m. to midnight both forces gradually decreased; a little previous to midnight the disturbance became more marked, the declination needle taking a westerly movement of 57', the maximum occurring a little after midnight. A sharp easterly movement then followed lasting about five minutes, when the disturbance became less active. After 4 a.m. of the 4th the magnet again became unsteady and for the following two hours a marked storm was registered. The vibrations were very rapid, especially on the declination curve, changes of 53' in a short time were shown, then the magnet would quiet down considerably, to be followed again

by another burst of disturbance lasting about an hour. The force magnets do not show any large departures from their normals, the general character of the curves being of a vibratory nature. After 10 a.m. the magnets came to rest and continued quiet until a little previous to 10 p.m., when the declination magnet suddenly moved east 30', a few slow westerly swings brought it to its normal reading and it remained comparatively quiet up to the evening of the 11th, when a small disturbance set in. Sharp movements would occasionally appear followed by slow waves of disturbance. This disturbance passed off by 4 a.m. of the 12th. A quiet period then followed, lasting up to the 20th. On the morning of the 21st a slight disturbance commenced, but disappeared about 11 a.m. at 10 p.m. a quick easterly movement was recorded, it was repeated the next night but to an increased amount. On the morning of the 25th a slight disturbance began and continued off and on to the 30th. The daily curve of declination on the afternoon of the 28th was well marked. The magnets on the last day of the month were perfectly quiet.

On the 3rd, red auroral light with pulsating streamers suddenly appeared in the N.E. sky about 6.20 p.m. standard time, but did not continue long, fading to an ordinary diffused yellow glow and spreading over the north to an altitude of 40°. On the 11th, aurora class (IV).

On the 2nd, 7th, 8th, 9th, 10th, 18th, 19th, 22nd, 24th, 26th, 27th and 28th the sky was clear, on all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Acting Director.*

METEOROLOGICAL OFFICE,  
Toronto, May 18th, 1894.



## METEOROLOGICAL SERVICE, DOMINION OF CANADA

# Monthly Weather Review.

FEBRUARY, 1894.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

In February the mean atmospheric pressure in Canada was generally above average over the Lower Lake Region and eastward to the Gulf of St. Lawrence and below over the Lake Superior Region, Manitoba and the North-west Territories.

The greatest departure above normal (+.08) was at Halifax N.S. and the greatest departure below normal (-.06) at Edmonton N.W.T. The area of highest mean monthly pressure as shown by the Canadian American Chart lay over the State of Wyoming and the areas of lowest over British Columbia and to the eastward of Newfoundland.

During the 1st there was a well marked depression over the North-west Territories and high south-westerly to westerly winds with fine mild weather were pretty general. West and south-west of the Lake Region there was an area of high pressure and a westerly gradient with moderately cold weather prevailed from Ontario to the Maritime Provinces. During the 2nd a gradual transference eastward brought the low area to the northward of the Lake Region while the high pressure passed to the Atlantic Coast; in Quebec and the Maritime Provinces the temperature continued about average but rose nearly to the freezing point at most points in Ontario; in the North-west there was no decided change but in Manitoba at night it fell far below zero. Next day the 2nd as the depression passed from the Lake Region to the Gulf the weather was generally overcast from Ontario eastward and in Quebec and the Maritime Provinces there was light sleet or snow. At the same time there was an anti-cyclonic development between Manitoba and the Lakes accompanied by diminishing temperature, while a deep depression came in over the North-west Territories, there bringing very mild weather. At night Ontario and Quebec felt the influence of the anti-cyclone and the temperature fell rapidly with northerly winds and the 4th was a decidedly cold day both in these and the Maritime Provinces. From Montreal eastward it continued cold for two days, but in Ontario it became gradually milder and in the North-west was very mild.

On the 7th the development of three different storm centres was in progress over the western part of the Continent, one over the Upper Lakes, one over the South-west States and one in the North-west. The first of these moved rapidly across the Lakes, causing on the 8th light snow in the St. Lawrence Valley and rain in the Maritime Provinces while that in the South-west which was the most important of the three moved up the Mississippi Valley and during the night of the 8th absorbed the area from the North-west which during two days had caused light snow in Manitoba and the North-west. During the 9th the storm centre moved north-east from Iowa causing a heavy rainfall in the Lake Region while in the North-west there was an anti-cyclonic development and the weather was turning decidedly colder with northerly winds. On the 10th the centre passed eastward from western Ontario absorbing at night another depression on the Atlantic, the combined system causing a gale with snow and sleet, in the Maritime Provinces.

On the 11th the anti-cyclone was moving slowly eastward north of the Lake Region while there was a rapid cyclonic development over the South-west States. On the 12th the high pressure increased north of the Lakes while the cyclone moved rapidly north-eastward with increasing energy causing a heavy easterly gale and snow storm in the Lake Region and on the middle Atlantic Coast. At night the centre moved off the Coast and the 13th was fine and cold throughout the Dominion.

A depression which was developing over the Gulf of Mexico on the 13th moved quickly across the Southern States and thence to the Middle Atlantic coast causing a light snow fall in Southern Ontario. By evening of the 15th the storm centre was near the mouth of the Bay of Fundy and a heavy gale with snow and rain prevailed in the Maritime Provinces, followed next day by strong north-westerly winds.

An area of depression which was over the North-west States on the 16th moved slowly eastward while an anti-cyclone with diminishing temperature prevailed over the Canadian North-west. From the Lakes to the Gulf of St. Lawrence the depression decreased somewhat in energy, it gave a little snow and rain in Ontario early on the 18th and a larger amount later in the day in the Maritime Provinces. A small subsidiary depression developed immediately in its rear on the 18th and followed its predecessor to the Gulf causing a little snow in the Maritime Provinces on the 20th. The anti-cyclone had meanwhile continued to develop, spreading eastward and southward with very cold weather until by the 20th its influence was felt over the greater part of the United States and Canada.

During the 21st and 22nd a small depression moved from the northward of Lake Superior to the St. Lawrence Valley, whence on the 23rd it passed quickly eastward across the Gulf with rapidly increasing energy. The centre of the anti-cyclone then moved eastward from the North-west Territories, and on the 24th was to the north of the Lake Region where prevailed the lowest temperatures of the winter.

The last five days of the month were comparatively mild in the North-west Territories—this owing to two depressions which followed each other—one on the 26th and the other on the 27th from the Pacific. From the Lakes eastward the pressure continued above average with fine weather and gradually rising temperature.

On the morning of the 25th there was a developing depression over Florida, it moved directly up the Atlantic Coast to New Jersey, causing violent gales with rain, and in parts of New York snow. On the 26th it moved to the Atlantic, passing too far south to affect the Nova Scotian Coast.

#### TEMPERATURE.

The average temperature from the western parts of Ontario was above the average, eastward of that it was below, the greatest defect occurring in New Brunswick.

*The Highest and Lowest Temperatures in each Province during February were :*

British Columbia, 71°·0 on 26th at Keremeos ; —39°·5 on 19th at Stuart's Lake.

North-west Territories, 50°·0 on 28th at Medicine Hat ; —40°·0 on 18th at Pheasant Forks.

Manitoba, 43°·0 on 27th at Dauphin ; —39°·0 on 11th at Dauphin.

Ontario, 52°·0 on 27th at Spence ; —53°·5 on 24th at White River.

Quebec, 42°·6 on 19th at Richmond ; —36°·2 on 6th at Chicoutimi.

New Brunswick, 44°·9 on 18th at Fredericton ; —32°·0 on 14th at Chatham.

Nova Scotia, 46°·7 on 19th at Truro ; —24°·0 on 6th at Truro.

Prince Edward Island, 45°·5 on 18th at Georgetown ; —13°·5 on 25th at Charlottetown.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, FEBRUARY, 1894.

[illegible]

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION, &c.—Continued.

[illegible]





## PRECIPITATION.

The rainfall throughout the Dominion, with the single exception of the central district of Ontario has been considerably below the average.

*The general distribution is as follows :—*

In BRITISH COLUMBIA the rainfall on the coast 4'80 in. In some parts of the interior none has fallen.

In the NORTH-WEST TERRITORIES no rain has fallen.

In MANITOBA no rain is recorded except a few drops at one or two stations about the 29th.

In ONTARIO West and South-west District, it was 0'98 in., or 0'08 in. below the average. In the North and North-west District, it was 0'28 in., or 0'26 in. below the average. In the Central District, it was 0'91 in., or 0'26 in. above the average ; and in the East and North-east District it was 0'19 in., or 0'50 in. below the average.

In QUEBEC it was 0'02 in., or 0'31 in. below the average.

In NEW BRUNSWICK it was 0'34 in., or 1'05 in. below the average.

In NOVA SCOTIA it was 1'18 in., or 0'52 in. below the average.

In PRINCE EDWARD ISLAND it was 0'12 in., or 0'68 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Port Simpson, 6'80 in. ; Agassiz, 5'91 in. ; Loch Erroch, 6'05 in. ; Rivers Inlet, 7'03 in.

*Rainfall 1 inch and upwards in 24 hours :—*

3. Port Simpson, 1'10 in.

9. Port Dover, 1'15 in. ; Port Stanley, 1'20 in. ; Chatham, 1'43 in.

11. Halifax, 1'00 in.

16. St. Johns, N. F. L., 1'10 in.

18. Channell, 1'00 in.

25. Port Simpson, 1'79 in.

## SNOWFALL.

The snowfall has in general been below the normal, but in some places it was very heavy.

The general distribution is as follows :—

BRITISH COLUMBIA.—13'9 in. has fallen, but some stations report as much as 5 feet.

In the NORTH-WEST TERRITORY the average amount is exactly the same as in February, 1893, 6'6 in. or 2 in. above the average.

In MANITOBA 5'9 in. has fallen, or about double the average.

In the DISTRICTS OF ONTARIO the amount is 12'4 in. or 1'9 above the average ; 18'4 in. or 3'9 in. above the average ; 17'9 in. or 6 in. above the average ; 11'8 in. or 4 in. below the average.

In QUEBEC 14'1 in., or 5'5 in. below the average.

In NEW BRUNSWICK 19'3 in., or 3'1 in. below the average.

In NOVA SCOTIA, 7'0 in., or 11'6 in. below the average.

In PRINCE EDWARD ISLAND, 22'4 in., or 0'3 in. below the average.

*Snowfall 15 inches and upwards during month.*

BRITISH COLUMBIA. Port Simpson, 26 in. ; Donald, 15 in. ; Loch Erroch, 21 in. ; Barkerville, 17 in. ; Pilot Bay, 20 in. ; Rivers inlet, 32 in. ; Glacier 65 in.

NORTH-WEST TERRITORY. Pincher Creek, 27 in.

MANITOBA. Oulbank, 15 in.

ONTARIO.—Streatford, 16 in. ; Durham, 33 in. ; Lindsay, 16 in. ; Coldwater, 18 in. ; Bognor, 24 in. ; Beatrice, 20 in. ; Niagara Falls, S., 24 in. ; Owen Sound, 15 in. ; Chatham, 15 in. ; Galt, 15 in. ; Saugeen, 26 in. ; Pary Sound, 27 in. ; Port Dover, 19 in. ; Port Stanley, 15 in. ; Schreiber, 30 in. ; Sudbury, 15 in. ; Biscotasing, 28 in. ; Sprucedale, 24 in. ; Cottam, 17 in. ; Lucknow, 21 in. ; Stony Creek, 18 in. ; Alton, 21 in. ; Welland, 47 in. ; St. George, 20 in. ; Paris, 19 in. ; St. Mary's, 17 in. ; North Bruce, 20 in. ; Peterboro', 17 in. ; Bancroft, 19 in. ; Georgetown, 21 in. ; Aurora, 18 in. ; Orangeville, 27 in. ; Presque Isle, 37 in. ; Sunshine, 17 in. ; Warton, 29 in. ; Mount Forest 26 in. ; Princeton, 19 in. ; Blenheim, 15 in.

QUEBEC.—Anticosti, W. P., 22 in. ; Quebec, 20 in. ; Point des Monts, 18 in. ; Richmond, 23 in.

NEW BRUNSWICK.—St. John, 16 in.; Point Escuminac, 25 in.; Point Lepreaux, 20 in.; Parker's Ridge, 36 in.; Fredericton, 26 in.

NOVA SCOTIA.—Pictou, 16 in.; Truro, 15 in.

PRINCE EDWARD ISLAND.—Georgetown, 24 in.; Charlottetown 21 in.

NEWFOUNDLAND.—St. Johns, 109 in.; Channell, 20 in.

*Snowfall 4 inches and upwards in 24 hours :—*

1. Midland, 4 in.; Glacier, 6 in.; Channell, 9 in.; Point Clark, 4 in.; St. Johns, N.F.L., 6 in.
2. Missanabie, 4 in.; Schreiber, 4 in.; St. Johns, N.F.L., 5 in.
3. Point Escuminac, 4 in.; Chicoutimi, 6 in.; Quebec, 4 in.; St. Johns, N.F.L., 5 in.
4. Glacier, 4 in.; St. Johns, N.F.L., 12 in.
5. Barkerville, 4 in.; Presque Isle, 6 in.; Glacier, 5 in.
6. Glacier, 6 in.
7. Glacier, 4 in.; Pincher Creek, 5 in.
8. Shoal Lake, 4 in.; Richmond, 5 in.
9. Biscotasing, 6 in.; Hillview, 8 in.; Foxton, 4 in.; Georgetown, 5 in.; Thompson, 11 in.; Goderich, 4 in.; Hillview, 8 in.; Salmon Arm, 6 in.; Dauphin, 10 in.; Alton, 4 in.; Pincher Creek, 8 in.; Courtright, 7 in.; Parker's Ridge, 4 in.; Haliburton, 6 in.; Chatham, 12 in.; Minnedosa, 6 in.; Kingston, 4 in.
10. Abbotsford, 7 in.; Missanabie, 5 in.; Biscotasing, 12 in.; Shreiber, 6 in.; Heron Bay, 4 in.; St. Mary's, 4 in.; Burk's Falls, 4 in.; Huntsville, 6 in.; Presque Isle, 6 in.; Mount Forest, 5 in.; Durham, 8 in.; Thorold, 4 in.; Princeton, 5 in.; Glastonbury, 9 in.; Point Lepreaux, 5 in.; Richmond, 4 in.; Oakbank, 6 in.; Conestogo, 4 in.; Welland, 34 in.; Fredericton, 8 in.; Beatrice, 6 in.; Parker's Ridge, 7 in.; Galt, 4 in.; Parry Sound, 4 in.; St. Andrew, 6 in.; Quebec, 6 in.
11. Hazlemere, 5 in.; Schreiber, 4 in.; St. Mary's, 4 in.; Rapid City, 6 in.; Wiarton, 6 in.; Bathurst, 4 in.; Point Escuminac, 8 in.; Georgetown, 13 in.; Richmond, 4 in.; Duncan's Station, B.C., 4 in.; Niagara Falls, S., 10 in.; Charlottetown, 13 in.; Whiteside, 4 in.
12. Orillia, 4 in.; Georgetown, 7 in.; Midland, 4 in.; Sarnia, 4 in.; Presque Isle, 12 in.; Wiarton, 6 in.; Wilton Grove, 9 in.; Mount Forest 6 in.; Thorold, 5 in.; Princeton, 10 in.; Wyoming, 8 in.; Blenheim, 12 in.; Conestogo, 5 in.; Rivers Inlet, 4 in.; Stratford, 6 in.; Deseronto, 4 in.; Lindsay, 4 in.; Bognor, 4 in.; Shannonville, 6 in.; Point Clark, 6 in.; Norwood, 8 in.; Galt, 7 in.; Port Stanley, 8 in.; St. Johns, N.F.L., 20 in.; Ridgetown, 9 in.; Pelee Island, 12 in.; Cottam, 12 in.
13. Loch Erroch, 10 in.; Paris, 15 in.; Georgetown, 5 in.; Orangeville, 24 in.; Ennismore, 4 in.; Presque Isle, 8 in.; Deer Park, 5 in.; Lyons, 6 in.; Waterford, 9 in.; Dealtown, 8 in.; Scarboro', 6 in.; Oliver's Ferry, 4 in.; Mount Forest, 4 in.; St. George, 12 in.; Birnam, 6 in.; Welland, 10 in.; Alton, 10 in.; Stratford, 4 in.; Durham, 6 in.; Lindsay, 4 in.; Owen Sound, 4 in.; DeCewsville, 8 in.; Yarmouth, 6 in.; St. Johns, N.F.L., 40 in.; Lucknow, 4 in.; Lakefield, 6 in.
14. Thedford, 5 in.; Rivers Inlet, 13 in.; Stony Creek, 12 in.; Brantford, 7 in.
15. Donald, 5 in.; St. Andrews, 10 in.; Point Escuminac, 7 in.; Point Lepreaux, 12 in.; Glacier, 9 in.; Bathurst, 6 in.; Fredericton, 12 in.; Stony Creek, 4 in.; Pictou, 6 in.; Dalhousie, 5 in.; Parker's, Ridge, 14 in.; Yarmouth, 4 in.; Sydney, 4 in.
16. Loch Erroch, 6 in.; Schreiber, 6 in.; Cape Magdalen, 6 in.; Richmond, 6 in.; Rivers Inlet, 5 in.; Port Simpson, 8 in.; Sydney, 4 in.; St. John, N.F.L., 6 in.
17. Barclay, 4 in.; Burk's Falls, 5 in.; Denbigh, 5 in.; Oakbank, 4 in.
18. Quamichan, 7 in.; Duncan's Station, B.C., 6 in.; Pincher Creek, 8 in.; Anticosti, W. P., 8 in.
19. Pincher Creek, 5 in.
20. Wiarton, 4 in.; Point Escuminac, 4 in.; Georgetown, 6 in.; Truro, 4 in.; Parker's Ridge, 4 in.
21. Barclay, 4 in.
22. Wiarton, 9 in.; Saugeen, 6 in.; Parry Sound, 6 in.; Spence, 7 in.
23. Durham, 4 in.; Point Clark, 4 in.
24. Quesnelle, 8 in.; Barkerville, 4 in.; Glacier, 5 in.; St. Johns, N.F.L., 6 in.
25. Glacier, 9 in.
26. Princeton, 4 in.
27. Glacier, 6 in.

*Thunder storms recorded on—*

9. Courtright, sharp storm 7 p.m.; Stratford, sharp with heavy rain 8 p.m.; London, violent storm with gale of wind 8 p.m.; Coldwater, 10.15 p.m.; Bognor, Beatrice, Haliburton, Owen Sound, 8 p.m.; Point Clarke, Chatham, Galt, Port Rowan, Elora, Cottam, Pelee Island, very heavy, Ridgetown, Lucknow, Sprucedale, Brantford, Toronto, Conestogo.

10. Digby, Minden.

20. Digby.

*Aurora recorded*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Stuarts Lake, *fine*, Hillview, Alameda, III; Haileybury, III.

2. Portage la Prairie, IV; Saskatoon, IV; Hillview, Alameda, IV; Georgetown, IV; Truro, IV; St. Albans, IV; Minnedosa, II; Winnipeg, III; Medicine Hat, IV; Ridgetown.

3. Saskatoon, IV; Hillview, Alameda, IV; Belmont, Haileybury, II; Savanne, Clontarf, III; St. Albans, II; Gravenhurst, IV.

4. Chicoutimi, IV; Hillview, Alameda, IV; Cape Chatte, Belmont, Haileybury, IV; Father Point, III.

5. Saskatoon, IV; Hillview, Alameda, IV; Belmont, Savanne, Dalhousie, N.B.

6. Alameda, IV; Haileybury, Savanne, Truro, IV; Medicine Hat, IV; Dalhousie, N.B., Swift Current, II.

7. Alameda, IV; Port Arthur, II.

8. Saskatoon, IV; Haileybury, IV.

9. Chicoutimi, IV.

10. Welland, IV.

12. Stuarts Lake, Cape Chatte, Savanne, Fredericton, IV.

13. Chicoutimi, IV.

14. Chicoutimi, IV.

15. Portage la Prairie, IV.

16. Cape Chatte.

20. Stuarts Lake, Oakbank, II; Port Simpson, I; Stratford, II; Durham, IV; Ottawa, IV; Fredericton, III; Owen Sound, Parker's Ridge.

21. Chicoutimi, IV; Hillview, Oakbank, II; Richmond, II; Cape Chatte, Wallace, I; Georgetown, IV; Mount Forest, Shoal Lake, Birnam, IV; Haileybury, I; Princeton, Dalhousie, N.B., Stony Creek, I; Calgary, I; Swift Current, II; Lucknow, IV; Ridgetown, Cottam, Conestogo.

22. French Creek, B.C., *bright*, Agassiz. Portage la Prairie, I; Saskatoon, II; Henrietta, I; Brandon, Glenbow, I; Hillview, I; Pincher Creek, *red*, Alameda, I; Richmond, II; Dauphin, Georgetown, P.E.I., Cape Chatte, Wallace, Burk's Falls, III; Georgetown, II; Huntsville, III; Shoal Lake, Belmont, Pembina Crossing, I; Welland, I; Birnam, I; Paris, Virgil, III; Savanne, Pilot Bay, B.C., Port Steele, I; Hazlemere, B.C., Loch Erroch, B.C., Donald, B.C., Griffin Lake, B.C., Minden, Durham, IV; Truro, IV; Fredericton, II; Clontarf, IV; Chatham, Point Clark, II; Haliburton, I; Parker's Ridge, II; St. Albans, I; Dalhousie, N.B., Calvin, Stony Creek, II; Channell, 6 in.; Mattawa, 1 in.; Gravenhurst, III; Minnedosa, I; Port Arthur, II; Wallace, I; Battleford, I; Port Stanley, II; St. Andrews, IV; Medicine Hat, I; Brantford, Sprucedale, I; Lucknow, III; Ridgetown, Pelee Island.

23. Chicoutimi, IV; Portage la Prairie, II; Saskatoon, II; Henrietta, I; Brandon, *very bright*, Hillview, I; Alameda, I; Alton, I; Dauphin, Georgetown, P.E.I., Burk's Falls, I; Georgetown, Ont., II; Huntsville, I; Belmont, Rapid City, Pembina Crossing, I; Birnam, IV; Welland, I; Paris, Virgil, Haileybury, II; Savanne, Fort Steele, IV; Glacier, B.C., Minden, Stratford, II; Durham, IV; Deseronto, I; Ottawa, III; Lindsay, IV; Truro, II; Fredericton, I; Galt, Clontarf, II; Chatham, Haliburton, III; Port Rowan, Mattawa, Parker's Ridge, I; St. Albans, I; Calvin, Stony Creek, I; Beatrice, III; Bognor, I; Minnedosa, I; Charlottetown, III; Calgary, I; Edmonton, I; Sprucedale, I; Ridgetown, *very active*, Port Arthur, II; Wallace, I; Pary Sound, I; Battleford, II; White River, I; Kingston, III; Lakefield, Pelee Island, Spence, I; Cottam, Conestogo, Gravenhurst, Port Stanley, II; Halifax, III; St. Andrews, IV; Grand Manan, IV.

24. Chicoutimi, IV; Saskatoon, IV; Henrietta, II; Hillview, IV; Oakbank, I; Georgina, Pembina Crossing IV; Haileybury, IV; Durham, IV; Truro, IV; Port Rowan, Calvin, Minnedosa, I, Port Arthur, I.

25. Chaplin, IV; Alameda, III; Haileybury, IV; Port Rowan, Minnedosa, IV; Swift Current, III; Edmonton, I; Gravenhurst, IV.

26. Stuart's Lake, Chaplin, I; Hillview, IV; Renfrew, Haileybury, IV; Truro, IV.

27. Chicoutimi, Saskatoon IV; Father Point, IV; Pelce Island.

28. Saskatoon, IV; Glenbow, II; Alameda, II; Scarboro', Savanne, Deseronto, I; Clontarf, IV; Calvin, IV; Stony Creek, II; Georgina, IV; Kingston, II; Port Dover, II; Father Point, II; Lucknow, IV; Ridgetown, Spence, I; Cottam, Conestogo, Gravenhurst, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF FEBRUARY, 1894.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....			0.00	0.04	0.11	0.21	0.31	0.25	0.31	0.31	0.29	0.16	0.05			
AGASSIZ, B.C.....				0.1	0.13	0.20	0.26	0.28	0.22	0.21	0.17	0.08				
INDIAN HEAD.....				0.0	0.07	0.31	0.49	0.48	0.41	0.35	0.21	0.12	0.0			
BRANDON.....					0.12	0.49	0.65	0.66	0.67	0.8	0.73	0.42	0.11			
WINNIPEG.....			0.01	0.20	0.47	0.56	0.61	0.62	0.62	0.65	0.65	0.50	0.10			
WOODSTOCK.....				0.04	0.22	0.35	0.50	0.52	0.58	0.65	0.70	0.39	0.21	0.06		
TORONTO.....				0.31	0.51	0.50	0.58	0.65	0.65	0.62	0.61	0.4	0.25	0.8		
LINDSAY.....				0.02	0.26	0.33	0.45	0.52	0.56	0.52	0.51	0.39	0.33	0.20		
BARRIE.....					0.11	0.21	0.38	0.44	0.50	0.52	0.48	0.32	0.20	0.01		
KINGSTON.....			0.01	0.18	0.37	0.50	0.49	0.53	0.51	0.5	0.52	0.48	0.21			
MONTREAL.....				0.14	0.41	0.51	0.51	0.49	0.49	0.62	0.49	0.45	0.04			
FREDERICTON.....					0.20	0.45	0.61	0.67	0.65	0.60	0.60	0.55	0.39	0.01		

	ESQUIMALT.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.19	0.17	0.29	0.41	0.41	0.39	0.49	0.41	0.34	0.39	0.47	0.51
MAXIMUM DAILY AMOUNT.....	0.86	0.82	0.89	0.90	0.91	0.95	0.91	1.00	0.90	0.99	0.94	0.92
DATE.....	21	21	22	26	27	22	24	2	24	24	24	19
NO. OF DAYS COMPLETELY CLOUDED.....	13	10	11	4	4	6	2	6	5	4	4	4

### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 545. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	88	60	7	12	82.4
LOWER LAKE REGION.....	103	83	10	10	85.4
UPPER ST. LAWRENCE.....	92	72	8	12	82.6
LOWER ST. LAWRENCE.....	86	67	10	9	80.7
GULF.....	86	73	7	6	84.0
MARITIME PROVINCES.....	90	61	15	14	79.1
TOTAL.....	545	428	57	60	82.8

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions, the reports from all observing stations, as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer R. F. Stupart.

#### STORM WARNINGS.

During the month, warnings on the approach of five storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 60, all of which were verified. At 10 stations, however, the force did not reach that indicated by the signals displayed; 3 stations reported warnings received late, owing to delay in issue, and 1 station owing to delay in transmission.

In connection with the warnings, predictions as to the probable directions of the wind were given, and of the 60 warnings verified as to force, all were fully verified.

1. At 10.20 p.m., on the 9th, Gulf and Ocean stations were warned for a heavy easterly gale in advance of an important disturbance then situated in the Lake Region. Subsequently as it passed over the Maritime Provinces it caused during the afternoon and night of the 10th a fresh to strong gale from the eastward. Signals were lowered at 9.40 a.m. on the 11th.

2. All stations opened to navigation were warned at 10.20 p.m., on the 12th for a heavy north to east gale, owing to an important low pressure area which covered the country from Ohio to the Middle Atlantic Coast. This area of low pressure afterwards traversed the Atlantic some distance to the southward of the Maritime Provinces, and although the storm was pretty generally felt on our coasts in a moderate form, it was only reported as a fresh gale in one or two places. Signals were lowered at 3.40 p.m. on the 13th.

3. Gulf and Ocean stations were warned at 10.10 a.m. on the 15th for a heavy easterly gale, owing to the approach of an important storm from the Atlantic. During the evening and night the storm swept over the Maritime Provinces, causing a very heavy gale from the eastward, as well as a large amount of snow. The anemometer at Grand Manan recorded 49 miles an hour, and the one at Low Pt. 54 miles an hour. The *St. John Sun* in speaking of this storm says:—"Last night's storm was the worst of a list of big ones that have followed one another in rapid succession, and piled up the drifts all over the country, stopping lumbering operations and impeding traffic." Signals were lowered at 10.15 p.m. on the 15th.

4. Gulf and Ocean stations were warned at 10.15 p.m. on the 17th for a heavy south to west gale in advance of a deep depression centred over Lake Superior, and on the 18th during its passage over the districts warned a heavy gale from the directions indicated was everywhere experienced. At Grand Manan the anemometer recorded 62 miles an hour. Signals were lowered at 10.15 p.m. on the 18th.

5. All stations open to navigation were warned at 10.40 a.m. on the 26th for a heavy easterly gale on account of a disturbance centred over Maryland. It afterwards passed some distance to the southward of Nova Scotia, and although our signal stations seem agreed that no storm occurred, yet the anemometers at the exposed points of Grand Manan and Low Pt. recorded N. N. E. 44 and N. 40 miles an hour respectively, proving in connection with the charts that heavy weather prevailed on the Atlantic. Signals were lowered at 10.35 p.m. on the 26th.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR FEBRUARY, 1894.

The first day of the month was free from disturbance up to 11 p.m., when the magnets became a little unsteady and they continued so up to the morning of the 4th when they became much quieter. Slight disturbance again set in on the 6th and continued occasionally to the 8th. From the 8th to the afternoon of the 12th the magnets were quiet. A slight disturbance sprang up on the night of the 12th but by 4 a.m., of the 13th it had ceased. Another small disturbance appeared on the 16th and its action was apparent up to the night of the 20th when it assumed a more important character. About 6.25 a.m., of the 21st the declination needle took a marked westerly movement, attended by a decrease of both components of the force. This westerly change of declination amounted to over  $1^{\circ}4'$ . After reaching its maximum the needle vibrated considerably when a return easterly swing began and by 8 a.m., the magnet had comparatively settled down but still there was a decided appearance of continued disturbance. Marked variations were recorded from 9 a.m., to 1 p.m., and from 7 to 8 p.m. About 5.15 p.m.,

of the 22nd the magnets were suddenly deflected the declination needle moving east, small changes then began and they became more important at 9.25 p.m., the horizontal component at that time showing a sharp decrease. After the needle resumed its normal position some rapid changes began, the largest being a diminution of .0060 C. G. S. in a short time followed by a rapid recovery. The vertical component was also very much disturbed. A marked minimum of both forces occurring at 10.23 p.m. The declination needle a little previous to this time showed some large movements on each side of its normal position. A lull in the storm set in about 10.30 p.m., but the disturbance began again at 0.40 a.m., of the 23rd the declination needle then moving west and vibrating considerably. All morning of the 23rd an important storm was going on. Deflections of the needle on each side of its mean position amounting to  $1^{\circ}$  were registered, some of the movements bear a very close resemblance to those registered on the morning of the 21st. Both forces decreased rapidly on the morning of the 23rd.

About 1 p.m., the magnets were much quieter but after 4 p.m. the movements again increased and during the night of the 23rd an important storm was registered. About 10 p.m., it was particularly active both components of the force being then rapidly diminished the declination changing  $2^{\circ} 25'$  in fifteen minutes of time. After 2 a.m., the storm passed off. On the morning of the 25th another severe storm set in. At 2.30 a.m., of the 25th the declination needle took a sharp easterly hitch followed immediately by a larger westerly swing, but it was not until shortly before 6 a.m. that it assumed an important character. At 6 a.m. rapid vibrations were going on and the declination needle was considerably west of its normal position. At 6.45 a quick easterly sweep of  $1^{\circ} 10'$  was registered. After 8 a.m. the storm became less active, but up to the evening of the 25th the curves present a decidedly disturbed appearance, some of the oscillations being extremely rapid. During the early portion of the disturbance both forces decreased rapidly, and after 7 a.m. a recovery began. After 8 p.m. the disturbance passed off. Between 2 and 4 a.m. of the 26th the curves were a little irregular. The magnets remained tolerably steady until 10 a.m. of the 28th, when an important storm suddenly appeared, the declination needle moving sharply to the west, accompanied by an increase of the horizontal component, for about one hour's time some quick deflections were recorded, and continued to 4 p.m. Between 2 and 4 p.m. the declination magnet was east of its normal position. Both forces increased considerably from 0.30 to 4 p.m. The maximum value of the h. f. taking place at 3.39 p.m. This disturbance continued to 11.30 p.m., when the magnets suddenly came to rest, the movements during the latter part being more undulatory.

In connection with the above disturbances auroral light was observed on the 21st with faint streamers in N. and N. E. from 7 to 7.30 p.m.

On the 22nd a brilliant aurora was observed at 8.15 p.m. At 10.15 p.m. a very beautiful display began, showing crimson and green streamers and corona, but no pulsations. This display was preceded by fleecy auroral clouds, and during the time of greatest activity streamers to the corona extended from some degrees south of the celestial equator. The aurora first began in the N.W. with green streamers, and immediately afterwards streamers in the east expanded like a scroll until meeting the N. W. streamers it became rose coloured to the eastward and westward.

On the 23rd, as soon after sunset as possible, auroral light was recognized in the north, but no clouds or haze before sunset could be called auroral in appearance. At 6.15 p.m. there were bright yellow streamers and patches to an elevation of  $50^{\circ}$  and extending to  $10^{\circ}$  south of east. At 6.30 p.m. the auroral light extended and became more active and strongly tinged with red. At 7 p.m. there was bright diffused light in the N. E. and E., and at 7.30 p.m. some fine detached streamers in N. E., increasing in vigour and extending to zenith. This continued without much change until 9.30, when a sudden burst of activity developed into one of the most magnificent displays seen for some time in Toronto. A marked absence of the mere pencil or streamer was noticed, but patch upon patch, wave upon wave flashed to the zenith forming at 9.30 a splendid corona. At this time the auroral display seemed to flow from all parts of the heavens being as near the horizon in all parts as in the north.—In fact we seemed to be in the centre of a vast tent of brilliant colours, yellow, red, green and bright silver.

10 p.m. much fainter and less active.

10.45 do do do

11.30 p.m. Some sudden burst of light, patches and waves rising to the zenith. Midnight, remaining much the same.

At 4 a.m. of the 25th patches of yellow aurora in N. and N.E., extending to upwards of  $45^{\circ}$  in elevation.

On the 4th, 6th, 11th, 15th, 18th, 24th, 26th, 27th and 28th the sky was clear but no aurora was observed; on all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,

*Acting Dir., &c.*

METEOROLOGICAL OFFICE,

Toronto, June 11th, 1894.





## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

MARCH, 1894.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### ATMOSPHERIC PRESSURE.

The highest abnormal pressure of the month covered the whole Atlantic coast, where it was 0.10 in. above average; whilst the lowest abnormal pressure was over the North-west being generally .10 in. below average. The mean track of cyclones was from Alberta and the Western States to the Gulf of St. Lawrence. There was one erratic depression from Texas which crossed the Lakes and passed to the same Gulf district. The average rate of travel of cyclones was 27.8 miles per hour.

The lower portion of an unimportant cyclone passed from the west across the Lakes on the 1st, where the weather remained fine. It reached eastern Canada next day, causing some local showers in Quebec and the Maritime Provinces. Anti-cyclonic conditions then spread over the whole country from the Lakes to the Atlantic, and continued until the 6th, with fine weather, excepting some showers in Western Ontario on the 5th. The temperature as a rule was moderate during the day time, but generally below the freezing point at night.

A cyclone covered the North-west until the 3rd, with fair cool weather. Then an anti-cyclone spread throughout the Territories with decidedly cold weather and a moderate snowfall, temperature generally falling below zero and continuing decidedly cold until the 7th. By the 6th the cyclone had been transferred from the North-west to the Lakes, causing the weather to become generally showery. Passing eastward it also caused showers throughout eastern Canada on the 7th, and then moved over the Gulf of St. Lawrence. Another anti-cyclonic period set in on the 7th, lasting throughout the Lakes and eastern Canada until the 11th, the accompanying weather being fine with moderate day temperatures and frosty nights.

An extensive cyclone moved in from the Pacific Ocean on the 7th, and soon covered the whole North-west Territories, accompanied by more moderate temperatures; the wind at times increasing to a moderate gale from the S. and W. Cyclonic conditions continued there until the 17th, with unsettled moderately cold weather and occasional local showers or snowfalls.

A cyclone which started in Nebraska moved across the Lakes on the 11th and north-eastward to the Gulf of St. Lawrence. It caused a fresh gale throughout the Lake and eastern districts with local falls of sleet or rain in the latter district. There was then a slight anti-cyclonic movement over these districts. This soon gave way to a cyclone of some importance, which developed over the Lakes on the 13th, causing a fall of rain or snow and a moderate N.W. gale. It moved quickly eastward and off the Atlantic coast, accompanied by high winds in eastern Canada.

From the 14th until the 18th; anti-cyclones and cyclones of small importance quickly alternated over the Lake and eastern districts with slight temperature changes, it being generally cool.

On the 18th a more important cyclone developed over the Lakes, accompanied by higher temperatures; attaining greater energy as it passed to the Atlantic coast, it caused a moderate to fresh N.W. gale throughout eastern Canada.

A change took place in the North-west on the 17th; the long continued cyclonic conditions were replaced by an anti-cyclone which next day stretched from the Rocky Mountains to the Lakes. It brought fine weather to the Lakes on the 19th, but gave a moderate snowfall in the North-west districts. By the 20th it had reached to large dimensions; stretching from the Atlantic to the Pacific. On this day a cyclone, which first appeared over Texas on the 18th had been moving slowly northward. On the 21st it divided in two, one part passing across the Lakes and Eastern Canada giving a general fall of snow or rain everywhere and then moving off the Atlantic coast on the 22nd. A short interval of fine weather followed, and when the other portion of the cyclone moved eastward over the Lakes and passed off the Atlantic coast on the 24th, giving a fall of snow and strong winds everywhere.

In the North-west the anti-cyclone continued with fine cool weather until the 22nd, when a small depression took place causing a few local snow falls. After passing Manitoba the cyclone developed considerable energy; steep gradients being formed on its western side, which caused a N.W. gale in Manitoba and the Lakes on the 24th. Passing the Lakes it diminished in energy, but gave a light fall of snow or rain at most places.

The pressure soon became anti-cyclonic again in the North-west, with fine cold weather, the temperature falling below zero.

This anti-cyclone spread over the greater part of the continent on the 25th, reaching the Maritime Provinces on the 27th, and brought fine cold weather everywhere. This continued till the 28th, when a trough of low pressure extended from the Lakes to the Gulf of Mexico. Next day, having moved eastward, it was over Eastern Canada, giving local falls of snow in Ontario, Quebec and Maritime Provinces. Anti-cyclonic conditions followed, but were of short duration.

A cyclone which first appeared off the Pacific coast on the 28th moved across the North-west Territories on the 29th and 30th, giving light local falls of sleet or rain and higher temperatures there. By the 21st it had reached the Lakes and soon extended to the eastern provinces, causing unsettled, showery weather and high S. to W. winds everywhere, whilst it was succeeded in the North-west by a slight increase of pressure and fair weather.

#### TEMPERATURE.

The average temperature was considerably above the normal at all stations, the greatest excess occurring in Ontario.

*The Highest and Lowest Temperatures in each Province during March were :*

British Columbia, 66° 0 on 27th at Spence's Bridge and Princeton ; — 25° 5 on 4th at Stuart's Lake.  
North-west Territories, 61° 6 on 29th at Medicine Hat ; — 30° 0 on 25th at Prince Albert.

Manitoba, 48° 0 on 14th at Dauphin ; — 27° 5 on 6th at St. Albans.

Ontario, 77° 2 on 18th at Lucknow ; — 35° 9 on 27th at White River.

Quebec, 60° 0 on 6th at Brome ; — 11° 4 on 31st at Chicoutimi.

New Brunswick, 64° 7 on 6th at Fredericton ; — 6° 3 on 25th at Chatham.

Nova Scotia, 58° 4 on 7th at Truro ; — 5° 5 on 25th at Sydney.

Prince Edward Island, 54° 9 on 6th at Georgetown ; — 2° 8 on 25th at Georgetown.

TEMPERATURE. WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, MARCH, 1894.

[illegible]



### ONTARIO—Concluded.

Fort Francis.....	24.3	+9.0	242.3	.....	7	16	19	23	3	13	3	19	11	10	1	93	7-1	14-2	21 NE	2.55	-0.71	7.24	2	0
Minden.....	31.2	+10.0	436.2	18	-0.2	27	20	19	35.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.86	-0.86	5.6	0	0	
Shannonville.....	36.3	+9.3	562.0	18	10.0	26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	-1.68	5.26	0	0	0	
QUEBEC:																								
Montreal.....	39.30	30.42	29.40	1.02	31.6	7.2	20.57.0	19	5.0	27	12.3	24.4	24.4	75	4	0	3	72	39	41	65	165	143	6
St. Hyacinthe.....	33.6	8.8	355.0	6	5.0	27	16.1	22.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Anticosti, W. P.....	24.2	3.6	11.38.0	6	5.0	23	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Richmond.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Quebec.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
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Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
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Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Beauport.....	31.2	9.0	158.4	.....	3.2	27	18.6	40.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		

## PRECIPITATION.

The rainfall throughout the Dominion, has been below the normal except in some portions of Ontario and in British Columbia.

*The general distribution is as follows :—*

In British Columbia the rainfall on the coast 2'47 in. In the interior, little has fallen.

In the North-west Territories only a few drops at one or two stations.

In Manitoba rain is recorded at a number of stations to a small amount about the middle of the month.

In Ontario, West and South-west District, it was 1'21 in., or 0'56 in. below the average. In the North and North-west District it was 1'16 in., or 0'17 in. above the average. In the Central District it was 1'24 in., or 0'17 in. below the average. And in the East and North-east District it was 1'00 in., or 0'02 in. above the average.

In Quebec it was 0'77 in., or 0'04 in. below the average.

In New Brunswick it was 0'99 in., or 0'95 in. below the average.

In Nova Scotia it was 1'83 in., or 0'72 below the average.

In Prince Edward Island it was 0'77 in., or 1'12 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Hazlemere, 5'12 in.; Loch Erroch, 7'56 in.; Agassiz, 5'81 in.; Abbotsford, 5'90 in.; Duncan's Station, 6'23 in.; Salt Spring Island, 5'07 in.

*Rainfall 1 inch and upwards in 24 hours :—*

1. Loch Erroch, 2'63 in.; Agassiz, 1'34 in.
2. Bermuda, 1'00 in.
7. Quamichan, 1'00 in.; Cowal, 1'04 in.
8. Quamichan, 1'03 in.
9. St. Johns, N.F.L., 1'00 in.
14. Quamichan, 1'20 in.
15. Duncan's Station, 1'44 in.; Esquimalt, 1'33 in.
18. Point Lepreaux, 1'05 in.
21. Thompson, 1'00 in.
28. Abbotsford, 1'33 in.
29. Loch Erroch, 1'36 in.

## SNOWFALL.

The Snowfall has been, in general, much below the normal quantity, with the exceptions of Nova Scotia and Prince Edward Island; and in the Province of Manitoba and the North-west Territories the fall at some stations has been in excess of the average.

*The Distribution is as follows :—*

In BRITISH COLUMBIA in some parts of the interior little has fallen; in other sections, and on the coast, some exceptionally large amounts are recorded.

In NORTH-WEST TERRITORIES about 8 in. has fallen, or about 6 in. above that of 1893.

In MANITOBA 15'8 in. has fallen, or about 7'8 above the average.

In the DISTRICTS OF ONTARIO the amount is 3'9 in., or 13'9 in. below the average; 9'5 in., or 12'4 in. below the average; 2'5 in., or 20'6 in. below the average; 3'1 in., or 17'8 in. below the average.

In QUEBEC 10'8 in., or 8'5 in. below the average.

In NEW BRUNSWICK 18'2 in., or 3'2 in. below the average.

In NOVA SCOTIA 25'2 in., or 7'8 above the average.

In PRINCE EDWARD ISLAND 21'0 in., or 7'5 in. above the average.

*Snowfall 10 inches and upwards during month :—*

BRITISH COLUMBIA.—Hazlemere, 14 in.; Pilot Bay, 25 in.; Barkerville, 14 in.; Loch Erroch, 20 in.; Glacier, 48 in.; Union, 43 in.; Rivers Inlet, 64 in.; Port Simpson, 14 in.

In NORTH-WEST TERRITORY. Medicine Hat, 10 in.; Swift Current, 10 in.; Qu'Appelle, 13 in.; Saskatoon, 12 in.; Banff, 13 in.

MANITOBA.—Hillview, 19 in.; St. Albans, 11 in.; Emerson, 14 in.; Fort Ellice, 11 in.; Brandon, 16 in.; Oakbank, 12 in.; (2) Brandon, 20 in.; Turtle Mountain, 33 in.; Rapid City, 11 in.; Mellendean, 17 in.; Shoal Lake, 11 in.; Treherne, 11 in.; Hartney, 20 in.

ONTARIO.—Saugeen, 11 in.; Port Arthur, 11 in.; Durham, 23 in.; Coldwater, 10 in.; Barrie, 15 in.; Fort Francis, 25 in.; Heron Bay, 17 in.; Barclay, 12 in.; Goderich, 12 in.; Burk's Falls, 11 in.; Schreiber, 38 in.; Missanabie, 18 in.; Haileybury, 13 in.; Uplands, 15 in.; Calvin, 12 in.; Biscotasing, 14 in.; Sprucedale, 10 in.; Beatrice, 11 in.

QUEBEC.—Quebec, 24 in.; Cape Magdalen, 13 in.; Richmond, 11 in.; Anticost, W.P., 25 in.

NEW BRUNSWICK.—St. Andrews, 10 in.; Chatham, 18 in.; Grand Manan, 21 in.; Bathurst, 16 in.; Dalhousie, 14 in.; Fredericton, 12 in.; Point Escuminac, 21 in.; Parker's Ridge, 33 in.; St. John, 15 in.; Point Lepreaux, 14 in.

NOVA SCOTIA.—Cow Bay, 29 in.; Port Hastings, 16 in.; Whitehead, 25 in.; Sable Island, 25 in.; Pictou, 37 in.; Yarmouth, 10 in.; Sydney, 33 in.; Halifax, 18 in.; Truro, 23 in.

PRINCE EDWARD ISLAND.—Charlottetown, 18 in.; Georgetown, 24 in.

*Snowfall 3 inch and upwards in 24 hours :—*

1. Rivers Inlet, 7 in.; Glacier, 7 in.; Barkerville, 4 in.
2. Glacier, 5 in.; Pincher Creek, 8 in.
3. Qu'Appelle, 3 in.
4. Rapid City, 7 in.
5. Turtle Mountain, 14 in.; Hartney, 10 in.; St. Albans, 5 in.; Oakbank, 3 in.; Minnedosa, 3 in.
6. Brandon, 15 in.
7. Rivers Inlet, 3 in.; Union, 4 in.
8. Rivers Inlets, 7 in.; Union, 4 in.; Glacier, 5 in.; Barkerville, 3 in.
9. Glacier, 4 in.; Schreiber, 3 in.
10. Rivers Inlets, 19 in.; Union, 5 in.; Glacier, 3 in.; Barclay, 4 in.
11. Mellendean, 4 in.; Rivers Inlet, 6 in.; Pincher Creek, 3 in.; Schreiber, 6 in.
12. Saskatoon, 4 in.; Sudbury, 6 in.
13. Cow Bay, 3 in.; Port Simpson, 6 in.; Coldwater, 3 in.; Lindsay, 3 in.; Denbigh, 7 in.; Burk's Falls, 3 in.; Rivers Inlet, 6 in.; Glacier, 4 in.; Princeton, 3 in.; Bancroft, 3 in.; Beatrice, 3 in.; Orillia, 4 in.; Missanabie, 3 in.; Sydney, 3 in.; Durham, 3 in.
14. Ennismore, 3 in.; Rivers Inlet, 14 in.; Union, 6 in.; Channel, N.F.L., 4 in.; Sable Island, 4 in.; Clontarf, 4 in.; Beatrice, 4 in.; Sydney, 3 in.; Quebec, 7 in.; Durham, 3 in.
15. Wiarton, 3 in.; Glacier, 4 in.; Agassiz, 3 in.; Loch Erroch, 8 in.; Pilot Bay, 13 in.; Point Clark, 3 in.; Conestogo, 3 in.; St. Mary's, 3 in.; Savanne, 5 in.; Nepigon, 3 in.; Missanabie, 3 in.; Schreiber, 12 in.
16. Point Escuminac, 4 in.; Henrietta, 3 in.; Saskatoon, 6 in.; Pictou, 3 in.; Schreiber, 3 in.; Battleford, 3 in.; Winnipeg, 3 in.; Port Simpson, 4 in.
17. Union, 10 in.; Abbotsford, 5 in.; Whitehead, 4 in.
18. Point Escuminac, 5 in.; Mellendean, 3 in.; Union, 4 in.; Loch Erroch, 5 in.; Barkerville, 6 in.; Hazlemere, 3 in.; Pictou, 5 in.; Parker's Ridge, 4 in.
19. Channel, N.F.L., 6 in.; Sable Island, 7 in.; Anticosti, W.P., 14 in.; Point des Monts, 6 in.; Whitehead, 5 in.; Swift Current, 3 in.
20. Turtle Mountain, 12 in.; Mellendean, 6 in.; Hillview, 3 in.; St. Johns, N.F.L., 11 in.
21. Sable Island, 3 in.; Emerson, 5 in.; Parker's Ridge, 5 in.; Barclay, 4 in.; Nepigon, 3 in.; Heron Bay, 4 in.; Schreiber, 5 in.; Port Arthur, 3 in.
22. Cow Bay, 4 in.; Point Escuminac, 3 in.; Cape Magdalen, 3 in.; Chicoutimi, 3 in.; Georgetown, 3 in.; Heron Bay, 3 in.; Missanabie, 5 in.; Schreiber, 3 in.; Charlottetown, 4 in.; Sydney, 3 in.; St. Johns, N.F.L., 5 in.; Truro, 5 in.
23. Cow Bay, 22 in.; Point Escuminac, 6 in.; Brandon, 3 in.; Biequet, 6 in.; Burk's Falls, 3 in.; Turtle Mountain, 6 in.; Mellendean, 4 in.; Treherne, 3 in.; Hillview, 4 in.; Fort Ellice, 3 in.; Pictou, 9 in.; Point Lepreaux, 7 in.; Dalhousie, 6 in.; Channel, N.F.L., 3 in.; Sable Island, 9 in.; Oakbank, 3 in.; Parker's Ridge, 12 in.; Uplands, 3 in.; Haileybury, 3 in.; Mattawa, 3 in.; Brome, 3 in.; Georgetown, P.E.I., 9 in.; Point des Monts, 5 in.; Port Hastings, 5 in.; Whitehead, 4 in.; St. Hyacinthe, 4 in.; Charlottetown, 6 in.; St. Andrews, 7 in.; Yarmouth, 5 in.; Sydney, 4 in.; Chatham, 5 in.; Quebec, 8 in.; Grand Manan, 10 in.; Halifax, 3 in.; Winnipeg, 3 in.; Montreal, 4 in.; Truro, 6 in.

24. Burk's Falls, 5 in.; Pictou, 8 in.; Anticosti, W.P., 3 in.; Sprucedale, 5 in.; Point des Monts, 4 in.; Whitehead, 12 in.; Spence, 4 in.; Calvin, 6 in.; Heron Bay, 3 in.; Biscotasing, 4 in.; Missanabie, 3 in.; Schreiber, 3 in.; Sydney, 8 in.; Parry Sound, 4 in.; Bathurst, 6 in.
25. Thompson, 4 in.; Point des Monts, 3 in.; Uplands, 3 in.; Haileybury, 7 in.
26. Point Escuminac, 3 in.; Glenbow, 3 in.; Goderich, 8 in.; Channel, N.F.L., 4 in.; Anticosti, W.P., 5 in.; Point Clark, 4 in.; Collingwood, 3 in.; Grand Manan, 5 in.; Bathurst, 4 in.
27. Midland, 3 in.; Cowal, 3 in.; Pincher Creek, 3 in.; Banff, 7 in.; Cape Magdalen, 3 in.; Saugeen, 7 in.; Medicine Hat, 4 in.; St. Johns, N.F.L., 3 in.; Durham, 12 in.
28. Wilton Grove, 3 in.; Dealtown, 3 in.; Glacier, 5 in.; Chatham, 3 in.; Stuart Lake, 3 in.
29. Lyons, 5 in.; Blenheim, 4 in.; Waterford, 3 in.; Ridgetown, 3 in.; Port Hastings, 9 in.; Parker's Ridge, 3 in.; Cottam, 4 in.; Digby, 6 in.; Halifax, 4 in.
30. Pictou, 10 in.; Channel, N.F.L., 10 in.; Georgetown, P.E.I., 7 in.; Halifax, 5 in.; Medicine Hat, 3 in.; Edmonton, 3 in.; St. Johns, N.F.L., 4 in.; Truro, 4 in.

*Aurora recorded—*

Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.

1. Saskatoon, IV; Hillview, IV; Edmonton, I; Minnedosa, III; Father Point, III.
2. Georgetown, IV; Alton, IV; Haileybury, IV; Durham, IV; Deseronto, II.
3. Point Escuminac, IV; Alton, IV; Prince Albert, II.
4. Saskatoon, IV; Pembina Crossing, III.
5. Alameda, IV; Channel Island, IV.
6. Saskatoon, IV; Channel Island, IV;
7. Pembina Crossing, IV; Fort Steele, III; Minnedosa, IV.
8. Fort Ellice, II; Glenbow, IV; Midland, I; Georgetown, IV; Pembina Crossing, IV; Deseronto, III; Hillview, III; Fort Steele, IV; Clontarf, IV; Cape Chatte, Chicoutimi, III; St. Albans, III; Ottawa, IV; Channel Island, III; Elora, Renfrew, Haileybury, IV; Peterborough, Moose Jaw, IV; Stony Creek, I; Cottam, Lucknow, IV; Gravenhurst, Kingston, II; Port Dover, IV; Quebec, IV; Fredericton, IV; Montreal, III.
9. Chicoutimi, IV; Kingston, I; Minnedosa, I; Deseronto, III; Toronto, IV.
10. Alameda, IV; Pembina Crossing, IV; White River, III.
11. Gravenhurst, IV; Truro, IV.
14. Moose Jaw, IV; Lucknow, IV; Prince Albert, III.
15. Alameda, IV; Chicoutimi, IV.
21. Fort Ellice, III; Saskatoon, III; Alameda, IV; Hillview, II; Alton, IV; Moose Jaw, IV; Minnedosa, III.
22. Channel, N.F.L., IV; Truro, III.
23. Minnedosa, IV; Saskatoon, II; Alameda, III; Shoal Lake, Hillview, II; Bancroft, III; Point Clark, II; Elora, Haileybury, II; Moose Jaw, IV; Gravenhurst, IV; Savanne, Medicine Hat, IV;
24. Saskatoon, IV; Brandon, Fort Francis, III.
25. Hillview, IV; Cape Chatte, St. Albans, II; Fort Francis, II.
26. Hillview, IV; Channel Island, IV; Conestogo, Haileybury, IV; Gravenhurst, IV.
27. St. Albans, IV; Mattawa, Savanne, Port Arthur, II.
28. Channel Island, IV; Port Arthur, II.
29. Saskatoon, IV; Georgetown, IV; Pembina Crossing, I; Chicoutimi, II; Channel Island, IV.
30. Pincher Creek, II; Saskatoon, IV; Hemietta, I; Point Escuminac, II; Alameda, IV; Scarborough, Georgetown, II; Pembina Crossing, III; Hillview, III; Fort Steele, II; Medicine Hat, III; Dalhousie, Pelee Island (*bright red*), Ridgetown, Brantford, I; Clontarf, 4; Georgetown, P.E.I., Paris, I; Alton, II; St. Albans, II; Parker's Ridge, I; Conestogo, Chatham, Elora, Haileybury, I; Peterborough, II; Moose Jaw, III; Cottam, Birnam, I; Niagara Falls, S. (*coloured*), Welland, III; Virgil, I; Lucknow, I; Galt, Charlottetown, IV; St. Andrews, II; Yarmouth, I; Port Stanley, II; Port Dover, II; Quebec, IV; Grand Manan, IV; Father Point, III; Durham, II; Spence's Bridge, III; Stratford, II; Fredericton, I; Toronto, I; Truro, I.



*Thunder-storms recorded on—*

3. White River.
4. Gravenhurst, Savanne.
5. Bognor.
6. Bognor.
11. Haliburton, Calvin, Mattawn, Uplands, Elora, Lion's Head, Burk's Falls.
12. Stuart's Lake.
13. Bermuda.
15. Cottam.
17. Galt, Point Clark, Midland, Wyoming.
18. Whiteside, Gravenhurst, Haliburton, Calvin, Mattawa, Beatrice, Norwood, Peterborough, Uplands, Georgina, Spence, Point Clark, Bancroft, Lion's Head, Ennismore, Burk's Falls, Durham, Coldwater, Lindsay.
19. Thompson.
20. London.
21. Virgil, Niagara Falls S., DeCewsville, Stony Creek, Coldstream, Waterford.
22. Blenheim.
28. Minnedosa.

*Appearance of Spring Birds, &c.:—*

CROWS.—Burk's Falls, 4th; Thedford, 1st; Wyoming, 3rd; Denbigh, 5th; Ridgetown, 1st; Clontarf, 2nd; Fort Francis, 10th; Point Clark, 3rd; Conestogo, 1st; Spence, 4th; Georgina, 1st; Haileybury, 10th; Stony Creek, 1st; Orillia, 2nd; Collingwood, 7th; Calvin, 5th; Haliburton, 6th; Minnedosa, 30th; Toronto, 18th.

ROBINS.—Pincher Creek, 31st; Stratford, 8th; Toronto, 7th; Truro, 26th; Burk's Falls, 19th; Waterford, 8th; Dealtown, 16th; Coldstream, 6th; Wyoming, 8th; Huntsville, 12th; Scarboro, 23rd; Midland, 9th; Nicola Lake, 22nd; Ridgetown, 7th; Clontarf, 16th; Paris, 10th; Alton, 8th; Bancroft, 18th; Bognor, 8th; Shannonville, 11th; Point Clark, 4th; Georgina, 4th; Owen Sound, 6th; St. Mary's, 10th; Minden, 13th; Peterboro', 12th; DeCewsville, 1st; Cottam, 8th; Birnam, 2nd; Beatrice, 11th; Welland, 7th; Virgil, 5th; Collingwood, 7th; Calvin, 31st; Lucknow, 6th; Gravenhurst, 13th; Galt, 7th.

BLUE BIRDS.—Burk's Falls, 19th; Dealtown, 8th; Cowal, 5th; Scarboro, 12th; Nicola Lake, 23rd; Paris, 8th; Owen Sound, 18th; St. Mary's, 10th; Peterboro', 10th; Stony Creek, 1st; DeCewsville, 4th; Cottam, 3rd; Lucknow, 6th; Stratford, 11th.

MEADOW LARKS.—Thedford, 7th; Cowal, 14th; Scarboro, 18th; Keremeos, 24th; Bancroft, 29th; Stony Creek, 9th; Cottam, 7th; Minnedosa, 26th.

WOODPECKER.—Thedford, 12th.

PLOVERS.—Thedford, 9th.

BLACK BIRDS.—Cowal, 10th; Wiarton, 20th; Paris, 16th; Bognor, 16th; Georgina, 18th; Owen Sound, 11th; St. Mary's, 12th; Minden, 6th; DeCewsville, 8th; Birnam, 8th; Welland, 7th; Virgil, 11th; Lucknow, 18th; Lindsay, 18th; Toronto, 19th.

DUCKS.—Emerson, 16th; Point Clark, 2nd; Peterboro', 7th; Beatrice, 30th; Virgil, 8th; Calvin, 19th; Gravenhurst, 18th.

WILD GEESE.—Denbigh, 17th; Midland, 16th; Alameda, 15th; Fort Steele, 29th; Alton, 8th; Emerson, 16th; Shannonville, 13th; Peterboro', 7th; Moose Jaw, 19th; Stony Creek, 23rd; Cottam, 22nd; Virgil, 8th; Gravenhurst, 15th; Pincher Creek, 25th; Fort Ellice, 13th; Minnedosa, 15th; Deseronto, 4th.

MARTINS.—Quamichan, 26th.

FROGS.—Thedford, 4th; Cowal, 3rd; Wiarton, 18th; Ridgetown, 6th; Paris, 18th; Alton, 16th; Bognor, 17th; Shannonville, 19th; Georgina, 21st; Birnam, 5th; Welland, 6th; Virgil, 5th; Lucknow, 5th; Galt, 7th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF MARCH, 1894.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....	..	..	0.04	0.23	0.33	0.42	0.36	0.38	0.45	0.40	0.34	0.37	0.23	.08	S.	..
AGASSIZ.....	..	..	.00	S.	.15	.20	.20	.21	.20	.23	.24	.18	.03	.00	..	..
BRANDON.....	..	..	S.	.20	.34	.37	.42	.50	.51	.54	.54	.55	.47	.10	..	..
INDIAN HEAD.....	..	..	.00	.06	.16	.43	.51	.64	.58	.52	.53	.36	.12	.00	..	..
WINNIPEG.....	..	..	.12	.23	.36	.35	.48	.49	.43	.45	.40	.33	.11	..	..	..
WOODSTOCK.....	..	..	.03	.13	.35	.44	.50	.45	.31	.21	.09	.04	S.	.00	..	..
TORONTO.....	..	..	.09	.29	.44	.44	.53	.49	.53	.57	.54	.45	.41	.16	..	..
LINDSAY.....	..	..	.08	.17	.22	.37	.41	.45	.47	.52	.46	.32	.25	.22	S.	..
BARRIE.....	..	..	.04	.21	.30	.42	.47	.53	.52	.55	.50	.42	.36	.12	..	..
KINGSTON.....	..	..	.14	.33	.44	.46	.45	.46	.45	.54	.50	.53	.36	.08	..	..
MONTREAL.....	..	..	.08	.36	.54	.50	.54	.49	.50	.51	.43	.40	.33	S.	..	..
FREDERICTON.....	..	..	.14	.37	.43	.47	.48	.55	.57	.52	.50	.48	.40	.18	..	..
			ESQUIMALT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.		
MEAN PROPORTION FOR MONTH.....			0.31	0.14	0.38	0.34	0.35	0.22	0.40	0.33	0.40	0.40	0.46	0.43		
(Constant sunshine being 1.)																
MAXIMUM DAILY AMOUNT.....			0.90	0.75	0.84	0.71	0.92	0.84	0.90	0.81	0.87	0.90	0.95	0.92		
DATE.....			20	20	28	27	7	29	2	3	14	3	10, 20, 27	20		
NO. OF DAYS COMPLETELY CLOUDED.....			8	12	7	8	5	11	3	5	4	3	7	8		

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 578. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	90	57	15	18	71.7
LOWER LAKE REGION.....	105	75	19	11	80.5
UPPER ST. LAWRENCE.....	96	68	14	14	78.1
LOWER ST. LAWRENCE.....	95	73	13	9	83.7
GULF.....	91	71	10	10	83.5
MARITIME PROVINCES.....	101	67	21	13	76.7
TOTAL.....	578	411	92	75	79.1

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer H. V. Payne.

## STORM WARNINGS.

During the month warnings on the approach of three storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 24, of which 19 or 79·2 per cent were verified. At 4 stations however the force exceeded that indicated by the signals displayed; two stations reported a storm for which no warning was sent.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 19 warnings verified as to force 19 or 100 per cent were fully verified.

1. At 10 a.m. of the 11th in consequence of a deep depression to the Northward of the Lake Region and which subsequently moved eastward with diminishing energy, signal No. 2 indicating a moderate westerly gale was ordered for stations in the Maritime Provinces. Moderate southerly and southwesterly gales set in very generally in the Districts warned early in the evening and lasted during the night accompanied at most points by rain. Safety telegrams were despatched at 10.40 a.m.

2. At 10.10 p.m. of the 13th in consequence of a developing storm then centered in the St. Lawrence Valley, signal No. 2 for a moderate south to west and north-west gale was ordered for the Bay of Fundy. The storm centre moved off the Coast of New England and apparently caused bad weather at sea, but the wind did not reach the force of a gale at any of the stations warned. Signals were lowered early on the 15th.

3. As on the morning of the 23rd there was a marked cyclonic development in progress over the Lower Lakes and Middle Atlantic States, signal No. 1 indicating a moderate easterly gale was ordered for stations in eastern and southern Nova Scotia. The storm moved very quickly eastward passing to the southward of Newfoundland that same night. A heavy gale and snow storm prevailed very generally in the Maritime Provinces during the afternoon and night, at first from eastward and then hauling round to the northeast and northwest. Safety telegrams were despatched at 10.20 p.m.

## TORONTO OBSERVATORY—MAGNETIC REVIEW FOR MARCH, 1894.

A slight disturbance prevailed on the 1st. There was no large departure from the normal until after 5 p.m. when a sudden deflection took place followed by a gradual westerly rise and the magnet came to rest shortly after 6 p.m. Another small disturbance appeared on the night of the 8th and disappeared by 2 a.m. of the 9th. The magnets then remained very steady up to the morning of the 11th when a little irregularity occurred. The afternoon and evening of this day was remarkably steady. On the 18th slow waves of disturbance was recorded, but during the evening the magnets calmed down considerably. The next important disturbance appeared on the 21st, but it was not until after 7 p.m. it assumed an important character, the disturbance only lasted for a few hours, but shewed increased activity after 10 p.m. Several slow movements of the declination magnet were registered. From 10 p.m. to midnight of the 21st both components of the force were below normal.

On the nights of the 22nd, 23rd, 24th and 25th slight disturbance was going on. From the 26th to the morning of the 30th the magnets were very steady. A little before 8 a.m. the magnets became disturbed a marked westerly movement of the declination needle being then shewn. A decrease of the horizontal component between 10 a.m. and noon was well marked. Nothing worthy of note was recorded until after 2 p.m. when the movements gradually increased and during the night of the 30th a large storm was registered, it was particularly active about 8.30 p.m. A change of declination of  $2^{\circ} 58'$  occurring in about fourteen minutes of time. Both forces gradually increased from 1 to 5 p.m. on the 30th and then fell rapidly. A rapid fall of the horizontal component set in after 6 p.m., the minimum being recorded at 8.29 p.m., the change of h. f. in three hours and nineteen minutes amounting to .0121 c.g.s. From 8 p.m. of the 30th to 2 a.m. of the 31st, the h. f. was considerably below the normal. A rapid decrease of both components was registered at 11.13 p.m. After 2 a.m. of the 31st the storm began to abate, but a slight disturbance continued to the end of the month.

On the 1st, 2nd, 3rd, 5th, 10th, 11th, 14th, 19th, 20th, 24th, 25th, 26th, 27th, 29th and 31st, the sky was clear but no aurora was visible. On all other nights clouds or haze would have hidden any aurora which might have existed. On the 9th auroral light in north class (IV.)

On the 30th at 8 p.m. the sky was covered with cirro stratus clouds and haze, east and west of zenith were bright patches among the clouds which looked like aurora. At 10 p.m. clouds cleared partially away disclosing auroral patches and streamers forming a corona. The aurora moving from the south like mist. It again clouded over. At 11 p.m. clouds gradually cleared away, patches and short streamers covering the whole sky. At 11.30 aurora still active then faded considerably. This display was generally observed throughout the Dominion.

R. F. STUPART,  
*Acting Director.*

METEOROLOGICAL OFFICE,  
Toronto, July 18th, 1894.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

APRIL, 1894.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### ATMOSPHERIC PRESSURE.

Pressure was generally below its average between the Rocky Mountains and the Mississippi Valley, the greatest Departure being as much as 0.100 in Northern Alberta and Saskatchewan, whilst east of the Mississippi and also over the Pacific States it was as a rule much above its average, and over the northern portion of the Gulf of St. Lawrence and in the Middle Pacific States the excess amounted to 0.150, and 0.100, respectively.

Eight low pressure areas have been charted, and their mean rate of travel was 19 miles an hour, and their general course was from the far North-west and north of the Lake Region.

April was remarkable for the abnormally high temperature which prevailed over the greater portion of the Dominion, especially in Northern Ontario, where the excess amounted to 5°. It was also noticeable for the large amount of bright weather in Ontario and Quebec.

Between the 1st and the 3rd an area of high pressure of some importance travelled from the North-west over Canada, giving fine and quite cool weather from the Lakes to the Atlantic, attended at first by high westerly winds, and at the same time a deep disturbance moved into the North-west Territories and Manitoba, causing rain or snow in nearly all localities, but as a rule the amount was very small.

The disturbance brought some showers in the Lake Region and the Upper St. Lawrence during the evening and night of the 3rd and on the 4th; and between the 4th and 5th it caused heavy rain in the Maritime Provinces, and a fall of snow in the Lower St. Lawrence and the Gulf. It was also accompanied by strong winds throughout its course and in some localities the force of a gale was reached.

In the Maritime Provinces and the Gulf of St. Lawrence the weather remained unsettled and some heavy rain or snow occurred up to the night of the 7th; elsewhere in Canada, however, it became fine, but it was for the most part cool.

A slight depression which skirted the southern portion of the Lower Lake Region during the early morning of the 7th, caused several inches of snow over the greater portion of South-western Ontario; next morning when it was off the Middle Atlantic Coast, it either developed much greater energy or was reinforced by another disturbance from the Atlantic, for at night a storm of importance was situated to the southward of the Bay of Fundy, and the easterly gale which had set in over the Maritime Provinces continued all next day and snow fell heavily; as much as twelve inches was recorded in many localities.

Between the 7th and 8th, during the presence of a disturbance, fresh to high winds prevailed from the Rockies to Manitoba, and rain or snow occurred in many localities; in portions of Manitoba the fall was heavy and at Winnipeg amounted to 1.12 inches rain and melted snow.

A depression which was apparently subsidiary to the one first mentioned, developed considerable energy during the night of the 9th; and on the 10th and up to the early morning of the 11th,

it gave, over the Lower Lake Region, strong easterly winds and a snowstorm; as much as eight inches of snow fell in many places. On the morning of the 11th it was centred off the New Jersey Coast as a severe storm and ultimately it moved slowly north-eastward to the southward of Nova Scotia, and caused an easterly gale to set in over the Maritime Provinces during the night of the 12th, and until the 16th, owing to its influence the weather continued very stormy along our Atlantic Coast, and snow and rain fell almost continuously and usually in large quantities.

The Ottawa and St. Lawrence Valleys and the Gulf escaped the bad weather and enjoyed a long period of remarkably fine weather which lasted from the 6th in the two former districts and from the 7th in the latter district, until the 19th the distribution of pressure was entirely anti-cyclonic and after the 8th the temperature became decidedly high, more especially in the Ottawa and the Upper St. Lawrence Valleys, and from the 11th, maxima between 60° and 70° were recorded daily.

In the Lower Lake Region, after the snowstorm, the weather also turned remarkably fine and mild and remained so until the 19th.

In the North-west Territories and Manitoba on the other hand the weather during this protracted period was for the most part very unsettled and cool, snow, sleet or rain fell frequently and high winds were prevalent. Between the 18th and 19th, owing to the influence of a disturbance which moved up from the South-west States, a strong north-easterly gale was experienced over Manitoba, and sleet and snow fell very heavily.

The disturbance, as it travelled, on the 20th, from Lake Superior into the Lower Lake Region made its influence felt by the showers that it gave that day in all localities as far as the Atlantic. It then hovered in the vicinity of the St. Lawrence Valley until the 23rd, gradually filling up, and ultimately, on the night of the 24th, passed off the Atlantic coast. Its unsettled and showery weather lasted in Ontario and Quebec until the night of the 23rd, and in the Maritime Provinces until the following night, although, again, on the 25th, there were a few scattered showers in Prince Edward Island and the Miramichi Valley.

Afterwards, until the end of the month, the weather was fine from the Lakes to the Atlantic, except that a few showers occurred between the nights of the 27th and 28th. Temperature was, as a rule, abnormally high, and the winds generally moderate.

In the North-west Territories and Manitoba from the 19th until the night of the 30th, the weather, for the most part, was very fine, although there were rains between the 24th and 25th, and Winnipeg had as much as .94 inches; again, between the 27th and 29th, local showers and thunderstorms occurred from the Rockies to Manitoba. Temperature was generally abnormally high, and maxima between 60° and 70° were of nearly daily occurrence. On the 26th, Calgary registered 70°, and Medicine Hat and Prince Albert, 76°; also, on the 29th, Winnipeg had 76°.

#### TEMPERATURE.

The average temperature in British Columbia was slightly below the average, although slightly above April, 1893. From the North-west Territories eastward to Quebec was from 3° to 6° above the normal. In the Maritime Provinces it was below the normal.

*The Highest and Lowest Temperatures in each Province during April were :*

British Columbia, 80° on 25th at Spence's Bridge and Princeton; 16° on 3rd at Princeton, and on 16th at Barkerville.

North-west Territories, 79° on 20th at Medicine Hat; -4° on 1st at Oonikup.

Manitoba, 77° on 20th at Winnipeg; -4° on 1st at Channel Island.

Ontario, 85° on 21st at Renfrew; -23° on 2nd at White River.

Quebec, 74° on 21st at St. Hyacinthe; -10° on 4th at Point des Monts.

New Brunswick, 68° on 28th at St. Andrews; -8° on 2nd at Dalhousie.

Nova Scotia, 69° on 27th at Halifax; 2° on 3rd at Pictou.

Prince Edward Island, 61° on 21st at Georgetown; 11° on 3rd at Charlottetown.

# PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, APRIL, 1894.

*n.* Barometer not reduced to Sea Level. \* Station not furnished with Registering Thermometers.

STATION.	Latitude N.	Longitude W.	PRESSURE.			TEMPERATURE.					DIRECTION OF WIND FROM					VELOCITY OF WIND.			PRECIPITATION.																	
			Elevation above Sea Level, in feet.	Mean reduced.	Highest.	Lowest.	Range.	Mean.	Difference from average.	Years observed.	Highest.	Lowest.	Date.	Mean daily range.	Mean temperature of dewpoint.	Mean amount of cloud.	No. of days completely clouded.	N.	N. E.	E.	S. E.	S.	W.	N. W.	C.	Total number of hours.	Mean miles per hour.	Highest day's velocity.	Date and direction from.	Amount.	Inference from average.	Days with 01 or more.	No. of fair days.	No. of Auroras.	No. of Thund. storms.	No. of Fogs.
BRITISH COLUMBIA:																																				
Esquimalt.....	48 25	123 35	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1		
Victoria.....	48 25	123 35	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Abbotsford.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Spence's Bridge.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Hastings.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Salmon Arm.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Chilcotin.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Alberni.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Port Hood.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Port Bay.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Leek Bay.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
French Creek.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
N. Vancouver.....	49 05	122 30	52	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Medicine Hat.....	50 11	110 57	2163	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Edmonton.....	53 14	113 28	2158	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
St. Albert.....	53 14	113 28	2158	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Calgary.....	51 11	114 04	2280	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Prince Albert.....	52 55	106 00	1902	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Regina.....	50 41	104 10	1850	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Conknap.....	50 41	104 10	1850	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Buff.....	50 41	104 10	1850	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07	30.41	29.45	0.96	30.18	0.73	1	29.45	30.41	4/1	30.18	1	1	1	1	1	1	1	1	1	0	80	681	7.8	24 1	5	42	4.0	6	15	6	1	
Winnipeg.....	49 58	97 05	1415	30.07																																







## PRECIPITATION.

In Ontario and the Maritime Provinces the rainfall has been considerably below the average. In Manitoba, the North-west Territories and British Columbia the amount has been larger than the average.

*The Distribution is as follows :—*

In British Columbia the general rainfall is 3·07 in., but at some stations no rain fell.

In the North-west Territories rain has fallen generally to the amount of 1·20 in.

In Manitoba the amount is 1·61 in., being 1·26 in. more than April, 1893, and 0·76 in. above the average.

In Ontario, West and South-west District, it was 1·40 in., or 0·56 in. below the average. In the North and North-west District it was 0·90 in., or 0·77 in. below the average. In the Central District it was 0·86 in., or 1·03 in. below the average; and in the East and North-east District it was 0·79 in., or 0·87 in. below the average.

In Quebec it was 1·37 in., or 0·06 in. above the average.

In New Brunswick it was 1·41 in., or 0·52 in. below the average.

In Nova Scotia it was 1·64 in., or 0·77 in. below the average.

In Prince Edward Island it was 1·16 in., or 0·62 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Abbotsford, 9·46 in.; Hazlemere, 8·79 in.; Alberni, 6·62 in.; Loch Erroch, 11·76 in.; Rivers Inlet, 14·48 in.; Port Simpson, 14·31 in.; Union, 5 in.; Duncan's Station, 5·08 in.; Agassiz, 8·25 in.

MANITOBA.—Gretna, 5·27 in.

*Rainfall 1 inch and upwards in 24 hours :—*

5. Sydney, 1·30 in.

9. Cowal, 1·07 in.; Esquimalt, 1·08; Port Simpson, 1·52 in.

10. Dealtown, 1·05 in.; Sarnia, 1·02 in.; Watford, 1·00 in.; Thedford, 1·00 in.; Ridgetown, 1·03 in.

17. Gretna, 1·72.

18. Pembina Crossing, 1·65 in.; Rosebank, 1·07 in.; Oakbank, 1·57 in.

22. Cape Magdalen, 1·00 in.

23. Point Lepreaux, 1·55 in.; Dalhousie, 1·09 in.

24. Channell, N.F.L., 1·02 in.

29. Port Simpson, 2·04 in.

30. Port Simpson, 2·56 in.

## SNOWFALL.

*The Distribution is as follows :—*

In BRITISH COLUMBIA, on the whole province about 4 in. has fallen.

In NORTH-WEST TERRITORIES 4 in. has fallen, slightly less than 1893.

In MANITOBA, 6·7 in. has fallen, or about 4 in. less than the average.

In the districts of ONTARIO the amount is 3·0 in., or 1·8 in. above the average; 3·2 in., 0·8 in. above the average; 5·5 in., or 3·8 in. above the average; 1·4 in., or 2·4 in. below the average.

In QUEBEC 3·9 in., or 3·8 in. below the average.

In NEW BRUNSWICK 13·7 in., or 6·1 above the average.

In NOVA SCOTIA 12·1 in., or 4·5 in. above the average.

In PRINCE EDWARD ISLAND 10·6 in., or 0·2 in. below the average.

*Snowfall 8 inches and upwards during month :—*

BRITISH COLUMBIA. Glacier, 53 in.; Rivers Inlet, 20 in.; Barkerville, 18 in.

NORTH-WEST TERRITORIES. Pincher Creek, 19 in.; Banff, 10 in.

MANITOBA. Channel Island, 8 in.; Oakbank, 15 in.; Emerson, 13 in.; St. Albans, 15 in.; Mellendean, 9 in.; Norquay, 20 in.; Treherne, 13 in.; Rosebank, 12 in.; Rathwell, 13 in.; Foxton, 10 in.

ONTARIO.—Thorold, 9 in.; Georgetown, 10 in.; DeCewsville, 9 in.; Alton, 8 in.; Welland, 25 in.; Missanabic, 8 in.; Savanne, 20 in.; Fort Francis, 11 in.; Port Dover, 10 in.

QUEBEC.—Anticosti, S.W.P., 11 in.; Anticosti, W.P., 17 in.

NEW BRUNSWICK.—Grand Manan, 14 in.; Parker's Ridge, 9 in.; Point Lepreaux, 30 in.; St. John, 25 in.

NOVA SCOTIA.—Cow Bay, 16 in.; Pictou, 16 in.; Sydney, 12 in.; Halifax, 18 in.; Yarmouth, 15 in.; Port Hastings, 11 in.; Whitehead, 16 in.; Truro, 20 in.

*Snowfall 3 inch and upwards in 24 hours :—*

3. Roseberry, 3 in.; Savanne, 7 in.; Missanabie, 4 in.; Heron Bay, 4 in.; Nepigon, 3 in.

4. Fort Francis, 5 in.; Parker's Ridge, 5 in.; Schreiber, 6 in.

5. Channell, 4 in.; Chicoutimi, 4 in.; Sarnia, 5 in.

7. Wilton Grove, 3 in.; Cowal, 4 in.; Coldstream, 4 in.; Thedford, 5 in.; London, 4 in.; St. John, 3 in.; Port Stanley, 5 in.; Birnam, 3 in.; Ridgetown, 6 in.; St. Mary's, 3 in.

8. Foxton, 5 in.; Morden, 3 in.; Oakbank, 6 in.; Winnipeg, 4 in.; St. John's, 4 in.; Yarmouth, 6 in.; Truro, 15 in.

9. Norquay, 3 in.; Whitehead, 3 in.; Port Hastings, 11 in.; Sydney, 6 in.; Grand Manan, 7 in.; Halifax, 6 in.; Yarmouth, 5 in.; Fort Francis, 6 in.; Point Lepreaux, 24 in.; Savanne, 4 in.

10. Georgetown, 3 in.; Deer Park, 3 in.; Aurora, 6 in.; Thorold, 9 in.; Whitehead, 12 in.; Stratford, 3 in.; Lindsay, 3 in.; Sydney, 6 in.; Port Dover, 4 in.; Port Arthur, 5 in.; Welland, 6 in.; Virgil, 3 in.; Georgetown, 4 in.; Cow Bay, 16 in.; Barelay, 3 in.; Savanne, 9 in.; Nepigon, 4 in.; Alton, 8 in.; Conestogo, 5 in.; Galt, 5 in.; DeCewsville, 4 in.; St. George, 6 in.

11. Fergus, 4 in.; Roseberry, 3 in.; Port Dover, 4 in.; Welland, 17 in.; Peterborough, 3 in.; Norwood, 3 in.

12. Oakbank, 3 in.

13. Pictou, 3 in.; Grand Manan, 5 in.; Halifax, 8 in.; Point Lepreaux, 6 in.; Lakefield, 3 in.

17. Foxton, 4 in.; Roseberry, 3 in.

19. Foxton, 10 in.; Turtle Mountain, 5 in.; Morden, 4 in.; Norquay, 10 in.; Treherne, 13 in.; Rosebank, 12 in.; Hartney, 3 in.; Rathwell, 11 in.; Oakbank, 6 in.; Channel Island, 5 in.; Winnipeg, 3 in.; Emerson, 3 in.; St. Albans, 8 in.

20. Norquay, 6 in.

24. Anticosti, W.P., 6 in.

25. Anticosti, W.P., 8 in.; Cape Magdalen, 4 in.; Anticosti, S.W.P., 8 in.

29. St. John's, 3 in.

30. St. John's, 5 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (II'), the feeblest in brilliancy.*

1. Haileybury, IV; Savanne, Pembina Crossing, IV; Port Arthur, III.

2. Haileybury, IV; Elora, Pembina Crossing, IV; Kingston, IV.

3. Prince Albert, II.

4. Channel Island, IV; Savanne, Bancroft, III; Brandon, Hillview, IV; Minnedosa, III.

5. Savanne, Clontarf, IV; Bancroft, III; Prince Albert, III.

6. Haileybury, III; Savanne, Calvin, Gravenhurst, IV; Elora, Clontarf, IV; Georgetown, IV; Hillview, IV; Treherne, Deseronto, III; Kingston, II.

7. Haileybury, III; Savanne, Bognor, IV; Calvin, Spence, I; Point Clark, IV; Gravenhurst, III; Lucknow, IV; Burk's Falls, III; Midland, III; Georgetown, IV; Huntsville, III; White River, III; Yarmouth, IV; Durham, IV.

8. Haileybury, IV; Savanne, Barrie, IV; Gravenhurst, IV; Prince Albert, I.

9. Channel Island, IV; Haileybury, IV.

10. Channel Island, IV.

11. Gravenhurst, IV; Prince Albert, III.

12. Channel Island, III; Haileybury, I; Bognor, IV; Barrie, II; Georgina, III; Calvin, Sprucedale, II; Minden, Point Clark, III; Birnam, III; Beatrice, III; Gravenhurst, I; Ridgetown; Kingston, III; Port Stanley, II; Lucknow, II; Brantford, IV; Elora, Stony Creek, II; Welland, IV; Virgil, III; Peterborough, I; Bancroft, III; Midland, I; Georgetown, II; Brandon, III; Belmont, London, I; Deseronto, I; Ottawa, I; Minnedosa, II; White River, II; Port Dover, Durham, II.

13. Savanne, Minden, Chatham, Paris, Coldwater, II; Kingston, II.
14. Port Arthur, II.
17. Spence's Bridge, III; Channel Island, IV; Calvin, I; Point Clarke, II; Birnam, IV; Gravenhurst, III; Welland, II; Burk's Falls, III; Deseronto, II; Ottawa, IV; Montreal, Quebec, III; Kingston, II.
21. Channel Island, IV; Pembina Crossing, IV.
22. Channel Island, IV; Savanne, White River, II.
23. Channel Island, IV; Haileybury, III; Savanne, Birnam, IV; White River, III.
24. Channel Island, IV; Haileybury, IV; Savanne, Calvin, I; Virgil, IV; Georgetown, IV; Montreal, White River, III; Durham, IV.
25. Haileybury, I; Savanne, Bognor, IV; Barrie, IV; Calvin, I; Gravenhurst, III; Clontarf, IV; Midland, I; Georgetown, IV; Hillview, III; Coldwater, II; Montreal, Father Point, III;
26. Channel Island, IV; Haileybury, IV; Calvin, Gravenhurst, IV; Midland, I; Brandon, IV; Coldwater, II; Prince Albert, III; Port Arthur, II.
27. Channel Island, IV; Haileybury, IV; Trenton, IV.
28. Channel Island, IV; Haileybury, IV; Father Point, III.
29. Haileybury, IV; Stratford, IV; Truro, IV.
30. Channel Island, IV; Haileybury, IV; Bancroft, III; Midland, II; Brandon, III; Hillview, II; Treherne, Prince Albert, II; Minnedosa, I, Truro, IV; Durham, IV.

*Thunder recorded on—*

4. Ennismore, Clontarf, Bancroft, Lindsay, Ottawa.
5. Denbigh, Georgetown, P.E.I., Pictou.
16. Owen Sound, Bognor, Point Clark.
17. Savanne, Fort Francis.
18. Midland, Denbigh, Pelee Island, Nottawasaga Island, Fort Francis, Deseronto.
19. Scarborough, Georgetown, Sunshine, Coldstream, Thedford, Collingwood, Georgina, Shannonville, Virgil, Trenton, Cottam, Bancroft, Welland, Elora, Alton, Barrie, London, Lindsay.
20. Burk's Falls, Scarborough, Midland, Trenton, DeCewsville, Welland, Gravenhurst, Norwood, Galt, Deseronto, Ottawa.
21. Deseronto.
24. Alameda.
25. Chaplin, Morden.
26. Glenbow, Fort Francis.
27. Rosebank, Birnam.
28. Oakbank, Lion's Head, Sunshine, Pelee Island, Moose Jaw, Brandon, Elora, Point Clark Ridgetown, London.
29. Fort Ellice, Shoal Lake, Oakbank, Saskatoon.
30. Cottam, Point Clark, Alton, Pictou.

*Appearance of Spring Birds, &c.:—*

- CROWS.—Channel Island, 7th; Barelay, 3rd; Shoal Lake, 2nd.
- GESE.—Channel Island, 12th; Fort Francis, 7th; Savanne, 25th; Cottam, 11th; Mellendean, 5th; Norquay, 6th; Hillview, 7th; Shoal Lake, 7th.
- ROBINS.—Channel Island, 25th; Fort Francis, 22nd; Savanne, 3rd; Spence, 5th; Shoal Lake, 8th; Oakbank, 25th; Fort Ellice, 8th; Pembina Crossing, 8th; Edmonton, 27th; Spence's Bridge, 3rd.
- SWALLOWS.—Fort Francis, 28th; Minden, 18th; Ridgetown, 28th; Lucknow, 25th; Elora, 16th; Peterborough, 17th; Clontarf, 27th; Bancroft, 19th; Georgetown, 14th; Spence's Bridge, 3rd, Toronto, 19th.
- WOODPECKERS.—Channel Island, 22nd; Owen Sound, 18th; Pembina Crossing, 20th.
- BLACKBIRDS.—Shoal Lake, 9th; Oakbank, 22nd; Pembina Crossing, 9th.
- FROGS.—Fort Francis, 22nd; Savanne, 27th; Calvin, 13th; Spence, 17th; Orillia, 15th; Haliburton, 16th; Minden, 11th; St. Mary's, 18th; Clontarf, 10th; Bancroft, 14th; Oakbank, 17th; Scarborough, 18th; Burk's Falls, 18th; Pembina Crossing, 16th; Spence's Bridge, 30th; Toronto, 13th; Truro, 21st.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF APRIL, 1894.

HOURS ENDING

	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....			8.	0 06	0 33	0 40	0 45	0 42	0 40	0 50	0 40	0 48	0 47	0 36	0 19	
AGASSIZ, R. C.....				02	11	25	31	35	34	52	57	19	03	03	01	
BRANDON.....			0 08	28	57	43	45	45	46	52	52	52	46	33	04	
INDIAN HEAD.....			05	17	39	46	46	49	51	49	45	37	13	07	8.	
WINNIPEG.....		0 12	49	29	30	34	42	49	45	45	41	41	37	26	06	
WOODSTOCK.....		03	25	50	50	61	64	63	58	65	57	53	49	21	03	
TORONTO.....		04	44	70	70	73	74	67	68	62	65	57	54	37	04	
LINDSAY.....		00	33	48	62	69	65	71	67	60	67	59	51	47	37	8.
BARRIE.....		03	38	61	61	70	70	64	60	61	61	61	61	49	05	
KINGSTON.....		08	44	56	62	62	63	64	66	64	57	58	56	41	06	
MONTREAL.....		02	39	61	66	64	67	67	62	57	54	51	41	18		
FREDERICTON.....		05	29	41	46	52	52	46	57	55	54	50	47	39	13	

	ESQUIMALT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0 33	0 15	0 36	0 29	0 33	0 46	0 56	0 55	0 54	0 52	0 55	0 42
MAXIMUM DAILY AMOUNT.....	0 80	0 56	0 85	0 80	0 89	0 90	0 90	0 97	0 90	0 89	0 96	0 92
DATE.....	21-23	3	29	29	21	30	17	25	24	25	29	17
NO. OF DAYS COMPLETELY CLOUDED.....	7	13	7	11	9	3	2	2	1	1	3	8

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 546. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA.....	91	75	11	5	88.5
LOWER LAKE REGION.....	98	80	13	5	88.3
UPPER ST. LAWRENCE.....	90	77	7	6	89.4
LOWER ST. LAWRENCE.....	88	76	7	5	90.3
GULF.....	83	72	5	6	89.8
MARITIME PROVINCES.....	66	66	27	3	82.8
TOTAL.....	546	446	70	30	88.1

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer B. C. Webber.

## STORM WARNINGS.

During the month warnings on the approach of three storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 40, of which 40 or 100 per cent were verified. At 6 stations the force exceeded that indicated by the signal displayed, and 8 stations reported a storm for which no warnings were issued.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 40 warnings verified as to force 40 or 100 per cent were fully verified.

No. 1. In advance of a disturbance approaching the Lakes from the North-west all stations on Lakes Huron, Erie, Ontario and the Georgian Bay were warned at 11.20 a.m. on the 3rd to expect a moderate gale from the S. and W. That afternoon and the next day a moderate to fresh south-westerly gale prevailed over the Lakes with heavy squalls at some places. Signals were lowered at 5 p.m. on the 4th after the passage of the low area across the Lakes.

No. 2. Lake Erie stations were warned at 10 p.m. on the 8th for a moderate easterly gale as a depression was moving north-eastward from the South-west States. It caused a fresh easterly gale on Lake Erie on the 9th and 10th and was then absorbed by another depression off the Middle Atlantic coast.

No. 3. Bay of Fundy stations were warned at 10 p.m. on the 10th for a moderate N.E. gale in advance of the above depression then off the Middle Atlantic coast. It caused a fresh N.E. gale in the Bay on the 11th. Signals were lowered at 11 p.m. on the 11th but the depression still hovered off the coast and on the 13th was again the cause of a fresh N.E. gale in the Bay.

### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR APRIL, 1894.

On the first day of the month the magnets were slightly disturbed from 1 to 2 a.m. A quiet period then set in, lasting up to the morning of the 5th, with the exception of small easterly deflections of the declination magnet, which occurred on the 2nd, 3rd and 4th. A marked similarity was shown both as to time and amount of change on the 2nd and 3rd, a little previous to the 10 p.m. observation. From 11 a.m. to noon of the 6th a slight irregularity was noticed, as also from 6 to 8 p.m. About 6.50 p.m. a sudden easterly sweep of the declination magnet took place, the disturbance, however, shortly passed off. A similar disturbance occurred after 2 a.m. of the 7th, but during the afternoon of this day the magnets were quiet, and became slightly disturbed during the evening. On the night of the 12th another small disturbance appeared and was visible also on the 13th and morning of the 14th. The next disturbance appeared a little previous to 6 a.m. of the 17th, and continued as a moderate disturbance for the following twelve hours. At 6 p.m. it was much more active and several important westerly deflections very similar in character were registered during this disturbance. At 2 a.m. of the 18th the declination magnet was west of the normal position, after which the magnet gradually quieted down. The disturbance appeared again on the 19th, but much modified. The 20th was slightly disturbed, also the 21st. The 22nd was comparatively quiet, as was also the 23rd up to 9.50 p.m., when a small easterly movement of the declination needle took place, and slight disturbance continued to 6 a.m. of the 24th, when the magnets steadied down. After 10 p.m. of the 24th, slight disturbing action set in, and continued for the following six hours. On the following night and early morning hours slow waves of disturbance were shown and disappeared about the same time as on the previous morning. At 10 p.m. of the 26th slight irregularity was shown, lasting a short time. At midnight the magnets became steady and continued so up to 11 p.m., when a slight disturbance commenced, lasting about an hour. Small disturbance was also shown on the morning of the 29th, and continued throughout the 30th, the declination needle showing a slow westerly change previous to midnight of the 30th.

On the 1st, 2nd, 5th, 6th, 8th, 9th, 11th, 14th, 15th, 17th, 21st, 22nd, 24th, 26th, 27th, 28th, and 29th, the sky was clear, but no aurora was observed; on all other nights clouds or haze would have hidden any aurora which might have existed. On the 12th, aurora, class II and III was observed; 9 p.m., faint diffused light in north; about 9.45 p.m. some bright yellow and green patches in N.N.W. moving east; 10 p.m. brilliant aurora springing up in north; midnight, aurora confined to north, and bright patches in north-east; the display was not active, and very transitory in its character. On the 13th, aurora, class IV, diffused light in north. On the 25th, class IV. And on the 30th, class III, auroral light in north, arch and bunches of streamers.

R. F. STUART,  
*Acting Director.*

METEOROLOGICAL OFFICE,  
Toronto, August 17th, 1894

# Monthly Weather Review.

MAY, 1894.

## INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington D. C.

## ATMOSPHERIC PRESSURE.

In May the areas of the greatest departure above normal pressure lay to the north of Lake Superior (0.05) and over the Maritime Provinces (0.05) and of greatest departure below normal over the Middle Atlantic States (0.07) and in Alberta (0.10). It was during the latter part of the month particularly that this distribution was produced by the protracted hovering of an important cyclone between the Lakes and Middle Atlantic States and subsequently the development of several smaller depressions in the same region, while higher pressure continued very persistently west and north of the Lake Region and Eastern Canada.

A small depression which was centered in Wisconsin on the morning of the 1st moved quickly eastward to the Gulf of St. Lawrence, giving southerly and south-westerly winds over Ontario and Quebec while the temperature at most points exceeded 70° and in parts of the Ottawa Valley was upwards of 80°. During the 2nd, the centre drew south over the Maritime Provinces where the weather became showery. A small depression which moved to Manitoba from the southward caused heavy rain and sleet in that Province during the 2nd, and then passing eastward gave heavy showers in Ontario during the night of the 3rd.

The charts of the 4th showed high pressure generally over the eastern portion of the United States and Canada and an extensive cyclonic development in progress over the North-west States and Territories. By the evening of the 5th, the storm centre was in Manitoba and rain was falling throughout the Lake Region. On the 5th it remained almost stationary north of Lake Superior, rain fell in Quebec and Maritime Provinces, while in the Lake Region there was a fresh south-westerly blow with fine weather and in Manitoba a strong north-westerly gale. On the 7th, storm passed eastward with the centre far to the northward and strong west and southwest winds were general from Lake Superior to Newfoundland with fine weather in Ontario and showery further east. The anti-cyclone following this cyclone was not well marked in the west but increased much in energy as it moved east.

By the 8th, another well marked depression had formed over the Northwest States and Territories, this during night of 8th, and on the 9th caused a pretty general rain in Assiniboia and Manitoba and then moving eastward with diminishing energy gave heavy showers in the Lake Region on the night of 10th, and along the St. Lawrence next day.

On 12th and 13th, anti-cyclonic conditions predominated east of the Mississippi and a cyclonic developement was in progress to the westward. The charts of the 14th, shewed little movement, but a gradual diminution of the anti-cyclone then centered over the Lake Region, this while a storm centre hovered and developed near Newfoundland causing strong northerly and north-westerly winds and showery weather in the Maritime Provinces, and the cyclonic conditions in the west became more pronounced. On the 16th, the storm centre east disappeared, but not so with the other which for two days had given excessive rains in Alberta and cool overcast weather with north-west winds in Assiniboia and Manitoba. From southern Minnesota the storm centre moved east and south-east, rain began in the Lake Region on the evening of the 16th and some very severe thunderstorms occurred in Western Ontario. On the 17th, the centre moved across Illinois and by evening a trough of low pressure extended from the St. Lawrence to Missouri, the weather was unsettled

and showery east to Montreal and a heavy northeast gale prevailed on lakes Michigan and Huron. On the 18th the centre moved to Pennsylvania and the weather continued showery in the Lake Region and the St. Lawrence Valley: the pressure which had steadily increased behind the storm was now high throughout the North-western and Western States and fine weather prevailed west of the Mississippi Valley. The chart of the evening of the 18th showed increasing pressure over the Gulf of St. Lawrence, this continued during the 19th and 20th, as an important high area set in over the Gulf while the storm centre hovered between the Lower Lakes and Virginia causing very excessive rainfalls over a large part of Ontario, south of the Georgian Bay. During the 20th and 21st the pressure steadily increased over the Lower Lakes, the rain continuing at most places with strong easterly winds. The charts of the 23rd showed the highest pressure over the North-west Territories and Manitoba and pressure not far from average but decreasing in the Lake Region and St. Lawrence Valley in both of which districts there were a few local rains.

On the 24th a fairly rapid cyclonic development occurred near the Middle Atlantic coast and drew northward causing a fall of rain over a large portion of Ontario. Next day it was dispersing near the New England coast, the pressure in Canada was generally a little below normal and local rains occurred.

The next depression charted formed in the Western States on the 26th and moved quickly to the Lakes where it caused numerous local thunder-storms on the evening of the 27th and in the St. Lawrence Valley next day.

During the 29th and 30th an anti-cyclone formed north of the Lake Region while the pressure was a little below average from the Lower Lakes south and south-westward. By the morning of the 31st there was a fairly well marked storm centre in New Jersey, this moved northward with increasing energy causing rain again in Ontario and also in Quebec and western portion of the Maritime Provinces.

In the Canadian North-west Territories between the 18th and end of the month the barometric gradients were generally for easterly and south-easterly winds and the weather was fine and warm.

#### TEMPERATURE.

The temperature, except in Nova Scotia, has been slightly above the normal, the differences however being small where a sufficient number of years observations for comparison exists.

*The Highest and Lowest Temperatures in each Province during May were :*

British Columbia, 100°o on 21st at Spence's Bridge ; 15°o on 1st at Stuart's Lake.

North-west Territories, 92°o on 30th at Medicine Hat ; 17°o on 1st at Banff.

Manitoba, 95°o on 30th at Fort Ellice ; 23°o on 8th at Fort Ellice and on 27th at Brandon.

Ontario, 85°o on 30th at Georgina ; 21°o on 9th at Sault St. Marie.

Quebec, 83°o on 1st at St. Hyacinthe ; 21°o on 1st at Grindstone.

New Brunswick, 81°o on 2nd at Fredericton ; 23°o on 4th at Parker's Ridge.

Nova Scotia, 75°o on 13th at Pictou ; 22°o on 1st at Truro.

Prince Edward Island, 73°o on 13th at Georgetown ; 26°o on 1st at Georgetown.







[illegible]

## PRECIPITATION.

The rainfall in general has been below the normal, except in the Province of Ontario, where the rain was excessively heavy, principally due to a heavy fall accompanying a severe disturbance, which remained almost stationary for some days in the third week.

*The General Distribution is as follows :—*

In British Columbia the rainfall was in general 2'44 in., or about 0'66 above the average.

In the North-west Territories, 1'11 in., about 1'32 in. below the average.

In Manitoba the rainfall was 1'21 in., or 1'24 in. below the average.

In Ontario, West and South-west District, it was 6'25 in., or 4'03 in. above the average. In the North and North-west District it was 4'20 in., or 1'65 in. above the average. In the Central District it was 7'46 in., or 5'58 in. above the average; and in the East and North-east District it was 4'06 in., or 2'65 in. above the average.

In Quebec it was 2'32 in., or 0'37 in. below the average.

In New Brunswick it was 1'48 in., or 1'81 in. below the average.

In Nova Scotia it was 2'08 in., or 1'29 in. below the average.

In Prince Edward Island it was 2'63 in., or 0'38 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

British Columbia.—Port Simpson, 8'07 in.; Pilot Bay, 5'60 in.; Langley, 5'05 in.; Abbotsford, 5'87 in.; Rivers Inlet, 5'67 in.; Loch Erroch, 6'67 in.

Ontario.—Barrie, 5'98 in.; Thedford, 5'61 in.; Cowal, 5'86 in.; Wyoming, 8'30 in.; Sunshine, 6'37 in.; Georgetown, 5'31 in.; Coldstream, 5'53 in.; Watford, 7'09 in.; Blenheim, 6'08 in.; Waterford, 6'11 in.; Bloomingdale, 6'10 in.; Aurora, 9'12 in.; Dealtown, 6'73 in.; Sarnia, 7'36 in.; Ennismore, 7'69 in.; Burk's Falls, 6'18 in.; Fergus, 5'57 in.; Deer Park, 8'57 in.; Toronto, 9'37 in.; Midland, 5'29 in.; Scarborough, 6'77 in.; Mount Forest, 5'82 in.; Port Rowan, 6'47 in.; Paris, 6'49 in.; Georgina, 7'84 in.; Birnam, 5'07 in.; Minden, 6'35 in.; Beatrice, 5'23 in.; Whiteside, 5'32 in.; Gravenhurst, 5'48 in.; Chatham, 5'80 in.; Uplands, 5'37 in.; Sprucedale, 5'37 in.; Orillia, 6'93 in.; St. George, 6'66 in.; Elora, 5'79 in.; Virgil, 7'07 in.; Ridgetown, 6'19 in.; Brantford, 6'48 in.; Conestogo, 5'92 in.; Norwood, 7'90 in.; DeCewsville, 7'64 in.; Lakefield, 6'28 in.; Peterborough, 7'58 in.; Thorold, 6'96 in.; Stony Creek, 8'77 in.; Trenton, 5'57 in.; Cottam, 5'38 in.; Welland, 7'71 in.; Schreiber, 5'49 in.; Courtright, 5'38 in.; Lindsay, 7'68 in.; London, 9'81 in.; Deseronto, 5'19 in.; Port Stanley, 6'56 in.; Port Dover, 6'18 in.

*Rain one inch and upwards in 24 hours :—*

2. Rathwell, 1'16 in.; Turtle Mountain, 1'40 in.; Port Simpson, 1'01 in.

3. Schreiber, 1'30 in.; Blenheim, 1'47 in.; Abbotsford, 1'77 in.

4. Loch Erroch, 1'65 in.; Hazlemere, 1'02 in.; Rivers Inlet, 1'12 in.; Langley, 1'54 in.; Port Simpson.

5. Oakbank, 1'00 in.; Fort Ellice, 1'04 in.; Minden, 1'00 in.; Orillia, 1'22 in.; Loch Erroch, 1'12 in.

6. Channel Island, 2'46 in.; Haliburton, 1'09 in.; Mount Forest, 1'52 in.

9. Port Simpson, 1'46 in.

15. Cowal, 1'34 in.; Loch Erroch, 1'10 in.; Princeton, 1'00 in.; Swift Current, 1'00 in.

16. Pincher Creek, 1'04 in.; Elora, 1'60 in.; Waterford, 1'22 in.; Cowal, 2'23 in.; Pilot Bay, 1'12 in.; Calgary, 1'60 in.

17. Alton, 1'00 in.; Port Rowan, 2'10 in.; Paris, 1'92 in.; North Bruce, 1'26 in.; Lucknow, 1'07 in.; Sarnia, 1'25 in.; Spence's Bridge, 1'08 in.; Courtright, 1'26 in.; London, 5'12 in.; Saugeen, 1'14 in.; Port Stanley, 1'51 in.; Port Dover, 1'35 in.; St. George, 1'77 in.; Brantford, 1'56 in.; Conestogo, 2'30 in.; Point Clark, 2'35 in.; Stony Creek, 1'03 in.; Fergus, 1'05 in.; Bloomingdale, 1'63 in.; Waterford, 1'17 in.; Blenheim, 1'30 in.; Lyons, 3'03 in.; Watford, 2'28 in.; Sunshine, 1'89 in.; Wyoming, 2'87 in.; Mount Forest, 1'53 in.

18. Port Rowan, 1'32 in.; Paris, 1'20 in.; Cottam, 1'75 in.; Welland, 1'54 in.; St. George, 1'23 in.; Stuart's Lake, 1'10 in.; London, 1'20 in.; Port Stanley, 1'59 in.; Port Dover, 1'32 in.; Virgil, 1'84 in.; Birnam, 1'06 in.; Ridgetown, 1'50 in.; Brantford, 1'48 in.; DeCewsville, 1'82 in.; Chatham, 1'34 in.; Stony Creek, 1'20 in.; Watford, 1'00 in.; Coldstream, 1'10 in.; Wyoming, 1'30 in.; Thedford, 1'39 in.; Dealtown, 1'94 in.; Orangeville, 1'06 in.

19. Bicquet, 120 in.; Welland, 205 in.; Virgil, 142 in.; DeCewsville, 185 in.; Pelee Island, 100 in.; Toronto, 124 in.; Beatrice, 113 in.; Lakefield, 155 in.; Orillia, 132 in.; Gravenhurst, 103 in.; Thorold, 172 in.; Deer Park, 242 in.; Midland, 125 in.; Lindsay, 123 in.

20. Barrie, 147 in.; Bancroft, 105 in.; Welland, 153 in.; Georgina, 219 in.; Haileybury, 121 in.; Coldwater, 116 in.; Rockliffe, 100 in.; Parry Sound, 114 in.; Toronto, 186 in.; Spence, 100 in.; Minden, 220 in.; Beatrice, 141 in.; Peterborough, 263 in.; Lakefield, 195 in.; Orillia, 147 in.; Trenton, 120 in.; Uplands, 130 in.; Gravenhurst, 142 in.; Whiteside, 120 in.; Stony Creek, 109 in.; Deer Park, 224 in.; Huntsville, 177 in.; Georgetown, 102 in.; Burk's Falls, 140 in.; Ennismore, 225 in.; Aurora, 486 in.; Midland, 125 in.; Scarborough, 130 in.; Lindsay, 210 in.

21. Barrie, 118 in.; Alton, 106 in.; Georgina, 111 in.; Peterborough, 150 in.; Stony Creek, 209 in.; Wyoming, 100 in.; Ennismore, 145 in.; Scarborough, 164 in.; Stuart's Lake, 105 in.; Toronto, 270 in.

22. Wyoming, 116 in.

25. Glastonbury, 250 in.; Calgary, 150 in.

26. Fergus, 146 in.; Bermuda, 198 in.

27. Norwood, 100 in.; Sprucedale, 137 in.; Burk's Falls, 160 in.; Charlottetown, 106 in.

28. Rivers Inlet, 101 in.; Port Simpson, 100 in.; Bermuda, 129 in.

29. Bermuda, 222 in.

#### SNOWFALL.

Snow has fallen in various parts of the Dominion, at some isolated stations to quite a large amount.

BRITISH COLUMBIA.—Glacier, 41 in.; Barkerville, 9 in.; Rivers Inlet, 12 in.

NORTH-WEST TERRITORIES.—Banff, 6 in.; Pincher Creek, 3 in.

MANITOBA.—Dauphin, 2 in.; Norquay, 3 in.

ONTARIO.—Nepigon, 2 in.; Barclay, 6 in.; Schreiber, 1 in.; Heron Bay, 4 in.; Haileybury, 3 in.; White River, 7 in.

NOVA SCOTIA.—Pictou, 15 in.

*Thunder recorded on—*

1. Roseberry, Thedford, Georgetown, Thompson, Haliburton, Peterborough, Ridgetown, Alton, Bancroft, Barrie, Lindsay.

2. Parker's Ridge, Georgetown, P. E. I., Sable Island, Point Escuminac, Point Lepreaux, Whitehead, Digby, Haileybury, Truro, Grand Manan, Halifax, St. Andrews.

3. Sable Island, Georgetown, Point Clark, Ridgetown, Lucknow, Truro, Durham, Quebec.

4. Lion's Head, Coldstream, Blenheim, Thompson, Elora, Savanne, Stuart's Lake, London.

5. Oakbank *heavy*, Henrietta, Scarborough, Thedford, Georgetown, Coldstream, Denbigh, Wilton Grove, Waterford, Stony Creek, Chatham, Trenton, Orillia, Clontarf, Shannonville, Point Clark, Conestogo, Brantford, Barrie, Elora, Welland, Alton, Bancroft, Channel Island, Chicoutimi, Picton, Lindsay, London, Coldwater, Deseronto, Woodstock, Toronto.

6. Oakbank, Brome, Scarborough, Midland, Lion's Head, Dealtown, Ennismore, Thedford, Wyoming, Georgetown, Coldstream, Blenheim, Stony Creek, Whiteside, Gravenhurst, Peterborough, Clontarf, Shannonville, Point Clark, Lindsay, Durham, London, Coldwater, Toronto, Port Stanley, Conestogo, Brantford, Ridgetown, Birnam, Elora, Lucknow, Georgina, Welland, Cottam, Paris, Bognor, Alton, Barrie, Stratford.

7. Brome, Richmond, Georgetown, P. E. I., Sable Island, Wyoming, Coldstream, Blenheim, Trenton, Orillia, Haliburton, Conestogo, Chicoutimi, Kingston, Port Stanley.

8. Georgetown, P. E. I., Sable Island, Moose Jaw, Wilton Grove, Orillia, Whitehead, Chicoutimi, Qu'Appelle, Regina.

9. Oakbank, Pelee Island Channel, Stratford.

10. Scarborough, Midland, Aurora, Presqu'Isle, Thedford, Cowal, Georgetown, Coldstream, Gravenhurst, Beatrice, Point Clark, Spence, Owen Sound, Brantford, Elora, Lucknow, Bognor, Alton, Durham, Parry Sound, Toronto, Port Stanley.

11. Pelee Island.

13. Shoal Lake, Fort Ellice, Pelee Island.

14. Alameda, Pincher Creek, Moose Jaw, Henrietta, Point Clark, Savanne, Cottam.

15. Cowal, Blenheim, Conestogo, Swift Current.

16. Scarborough, Presque Isle, Dealtown, Thedford, Cowal, Wyoming, Georgetown, Blenheim, Stony Creek, Pelee Island, Point Clark, Ridgetown Birnam, Elora, Cottam Paris, Stratford Durham, Woodstock, Toronto.

17. Scarborough, Midland, Wiarton, Aurora, Lion's Head, Dealtown, Sarnia, Thedford, Wyoming, Sunshine, Georgetown, Coldstream, Wilton, Grove, Lindsay, Durham, London, Woodstock, Toronto, Port Stanley.

18. Wilton Grove, Peterborough, Ridgetown, Welland, Cottam, Port Rowan, Woodstock, Kingston, Port Stanley.

19. Pincher Creek.

20. Pincher Creek, Thedford, Ridgetown, Birnam, Fort Steel, Port Stanley.

21. Cowal, Stuart's Lake, Fort Steele, London, Medicine Hat, Port Stanley.

22. Pincher Creek, Cowal, Wyoming, Wilton Grove, Port Rowan, Port Stanley.

23. Port Rowan, Banff.

24. Richmond, Whiteside, Gravenhurst, Clontarf, Bancroft, Lindsay, Parry Sound, Edmonton,

25. Scarborough, Midland, Aurora, Burk's Falls, Georgetown, Sutton, Huntsville, Stony Creek, Whiteside, Gravenhurst, Upland, Peterborough, Brantford, Georgina, Port Rowan, Alton, Lindsay, Coldwater, Toronto.

26. Thedford, Georgetown, Chatham, Upland, Pelee Island, Brantford, Georgina, Cottam, Bognor, Alton, Bancroft, Barrie, Agassiz, Fort Steele, Stratford, Durham, London, Bermuda.

27. Mount Forest, Scarborough, Midland, Wiarton, Lion's Head, Presque Isle, Thedford Burk's Falls, Cowal, Wyoming, Georgetown, Sutton, Wilton Grove, Peterborough, Beatrice, Point Clark, Spencer, Conestogo, Owen Sound, Woodstock, Toronto, Port Stanley, Birnam, Elora, Lucknow, Haileybury, Georgina, Cottam, Bognor, Alton Bancroft, Fort Steele, Stratford, Durham, London, Coldwater, Stony Creek, Whiteside, Gravenhurst, Uplands, Sprucedale, Orillia, Pilot Bay.

28. Brome, Richmond, Pincher Creek, Moose Jaw, Trenton, Peterborough, Pelee Island, Lindsay, Port Stanley.

29. Cowal, Deer Park, Stuart's Lake, Regina.

30. Wyoming, Georgetown, Wilton Grove, Ridgetown, Birnam, Pictou, Port Stanley, Regina.

31. Brantford, Banff.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Bancroft, III; Haileybury, IV.

2. Haileybury, IV.

3. Moose Jaw, IV; Cape Chatte, Truro, IV.

4. Elora, Durham, II.

6. Haileybury, IV; Mattawa, Elora, Pembina Crossing, III.

7. Hillview, III; Pincher Creek, Pembina Crossing, III; Montreal.

8. Haileybury, IV.

9. Haileybury, IV; Mattawa, Pembina Crossing, IV.

10. Mattawa.

12. Haileybury, IV.

13. Haileybury, I; Clontarf, IV; Brandon, Oakbank, Hillview, II; St. Albans, II; Montreal, Emerson, II; Saskatoon, II; Alameda, II; Brandon, IV; Pembina Crossing, III; Shoal Lake, Belmont, White River, III; Minnedosa, III; Prince Albert, II.

14. Haileybury, III; Channel Island, IV; White River, I; Toronto, IV.

15. Haileybury, IV; Brandon, IV; White River, III; Toronto, III.

16. Channel Island, IV; Rosebank, Yarmouth, IV.

17. Mattawa.

18. Mattawa, Pembina Crossing, IV.

19. Savanne, Emerson, III; Channel Island, IV.

20. Channell, IV; Savanne, St. Albans, III; Emerson, III; Pembina Crossing, III; Channel Island, IV; Truro, III.

21. Haileybury, IV; Portage la Prairie, Georgetown, P.E.I., Channel Island, IV; Truro, IV.

22. Lucknow, III; Georgetown, IV; Quebec, III.

24. Haileybury, III; Savanne.

25. Peterborough, IV; Gravenhurst, IV.

27. Savanne, Fort Ellice, III ; Brandon, IV ; Treherne, Pembina Crossing, IV ; Shoal Lake.
28. Barrie, III ; Dalhousie, Chicoutimi, Cottam, Savanne, Point Escuminac, III ; Georgetown, IV ; Thedford, III ; Brandon, Hillview, IV ; Fort Ellice, III ; St. Albans, I ; Moose Jaw, IV ; Saskatoon, II ; Georgetown, P.E.I., Cape Chatte, Pembina Crossing, II ; Channel Island, I ; Cartwright, Langley, B.C., Gravenhurst, Truro, III ; Durham, IV ; Coldwater, IV ; Father Point, II ; Toronto, IV.
29. Dalhousie, Elora, Point Escuminac, II ; Georgetown, IV ; Hillview, IV ; Emerson, IV ; Georgetown, IV ; Pembina Crossing, III ; Gravenhurst, Truro, IV ; Coldwater, IV ; Father Point, IV ; Port Arthur, II.
30. Barrie, III ; Bognor, IV ; Georgina, Haileybury, IV ; Elora, Birnam, IV ; Sprucedale, Gravenhurst, II ; Georgetown, III ; Thedford, III ; Midland, I ; St. Albans, III ; Montreal, Pincher Creek, Alameda, IV ; Georgetown, P.E.I., Pembina Crossing, III ; Fort Steele, II ; Gravenhurst, II ; Sprucedale, Truro, IV ; Durham, IV ; Father Point, III.
31. Welland, II ; Thedford, III ; Brandon, Hillview, III ; Saskatoon, I ; Pembina Crossing, IV.

*Frost or snow recorded on, snow too small for measurement is noted with a \**

2. Beaver Creek\*, Belmont\*, Cartwright\*, Rosebank\*, Rathwell\*, Turtle Mountain\*, Shoal Lake, 0.5 in.; Hillview\*, Treherne\*, Roseberry\*, Brandon\*, *ice* ; Minnedosa, 5 in.
3. Norquay, 3 in.; Haileybury, *frost* ; Chicoutimi, *frost* ; St. Albans\*, Glacier, 3 in.
4. Georgina, *frost* ; Barkerville, 4 in.; Glacier, 3 in.; Stuart's Lake, 2 in.
5. Beatrice, *frost* ; Clontarf, *frost* ; Haileybury, *frost* ; Alton, *frost* ; Banff\*, Uplands, *ice* ; Peterborough, Barkerville, 2 in.; Chilcotin\*, Glacier, 8 in.
6. Banff\*, Pictou\*, Barclay, 4 in.; Barkerville, 3 in.; Glacier, 12 in.; Calgary\*.
7. Hillview, *ice* ; Savanne\*, Schreiber\*, Banff, 2.3 in.; Pictou\*, Barclay, 2 in.; Chilcotin\*, White River\*.
8. Cartwright, *frost* ; Hillview, *ice* ; Treherne, 6° *frost* ; Roseberry\*, Owen Sound, *frost* ; Schreiber\*, Bancroft, *frost* ; Banff\*, Uplands, *ice* ; Barkerville\*, Chilcotin\*, Glacier, 5 in.; Nicola Lake\*, Swift Current, 2 in.; Calgary\*.
9. Shoal Lake, 0.3 in.; Brome, *frost* ; Beatrice, *frost* ; Lucknow, *frost* ; Haileybury\*, Georgina, *frost* ; Banff, 3 in.; Pictou\*, Sutton, *frost* ; Glacier, 2 in.; Calgary\*, Qu'Appelle, 3 in.; Regina\*.
10. Clontarf, *frost* ; Haileybury, *frost*\* ; Chicoutimi, *frost* ; Rivers Inlet\*, Glacier, 2 in.
11. Shannonville, *frost* ; Georgina, *frost* ; Fergus, 5 in.
12. Conestogo, *frost* ; Sutton, *heavy frost* ; Uplands, *ice*.
13. Clontarf, *ice*  $\frac{3}{8}$  in.; Pictou\*.
14. Haileybury, *frost* ; Georgina, *frost* ; Chicoutimi, *frost* ; Truro\*.
15. Brome, *frost* ; Clontarf, *ice*,  $\frac{1}{2}$  in.; Minden, *frost* ; Spence, *frost* ; Owen Sound, *frost* ; Lucknow, *frost* ; Welland, *frost* ; Alton, *frost* ; Clontarf, *ice*  $\frac{1}{2}$  in.; Midland, *heavy frost* ; Georgetown, *ice* ; Stony Creek, *ice* ; Whiteside, *frost* ; Gravenhurst, *frost* ; Truro\*, Woodstock, *frost*.
16. Haileybury, *frost* ; Clontarf, *ice*, *much damage to vegetation* ; Uplands, *ice*.
17. Savanne\*.
18. Pilot Mound, *frost* ; Rathwell, *frost* ; Treherne, 4° *frost* ; Sudbury\* and *frost* ; Spence\*, Biscotasing\*, Haileybury, *frost* ; Wiarton, *ice* ; Portage la Prairie, potatoes *froze*.
19. Cartwright, *frost* ; Pilot Mound, *frost* ; Hillview, *ice* ; Spence\*, Savanne, *ice* ; Sault St. Marie, Lucknow\*, Haileybury, *frost*, 2.5 in.; North Bay\*, Uplands\*, Oakbank, *ice*, ther. 21°.
20. Spence, 1 in.; Biscotasing\*, Missanabie, ther. 20° ; Haileybury, *frost*.
21. Fergus, 2 in.
23. Barclay\*.
24. Georgetown, P.E.I., *frost* ; Truro, *frost*.
25. Shoal Lake, *frost* ; Roseberry, *frost*.
26. Pictou\*.
27. Cartwright, *sharp frost* ; Norquay, *oats cut back* ; Pilot Mound, *severe frost* ; Rapid City, *ice*,  $\frac{1}{8}$  in.; Turtle Mountain, 5° *of frost* ; Shoal Lake, *frost* ; Hillview, *ice* ; Pembina Crossing, *frost* ; Treherne, 6° *frost* ; Roseberry, *hard frost* ; Brandon, *frost* ; Biscotasing\*, Schreiber,  $\frac{1}{2}$  in.; Missanabie, 2 in.; Heron Bay, 4 in.; Nepigon, 2 in.; Oakbank, *ice* ; St. Albans, *ice* ; Port Arthur\*, White River, 3 in.
28. Pilot Mound, *frost* ; Owen Sound\*, Brantford, *frost* ; Savanne, *ice* ; Schreiber\*, Cottam,

*frost*; North Bruce\*, Bognor\*, Alton, *ice*,  $\frac{1}{8}$  in.; Barrie\*, Pictou\*, Midland\*. Wiarton, *potatoes blackened*; Presqu'Isle\*, Sarnia, *frost, grapes and currants hurt*; Midland\*, Uplands\*, White River, 2 in.; Cowal\*, Wyoming, *blackened potatoes and beans*; Sunshine\*, Sutton, *frost*; Sprucedale\*, Mount Forest, *frost*; Stratford\*, London\*.

29. Birnam, *ice, great damage to vegetation*; Ridgetown, *froze corn*; Elora, *frost*; Savanne, *ice*; Lucknow, *grapes and all tender plants killed*; Haileybury\*, St. Mary's, *much damage*; Welland, *frost*; Paris, *tomatoes and grape vines nipped*; Port Rowan, *potatoes frozen*; Whiteside\*, Coldstream\*, Thompson\*, Peterborough, *frost*; Mount Forest, *frost*; Alton\*, *ice*; Barrie\*, Ennismore, *frost*; Thedford, *grapes, strawberries, potatoes and tomatoes badly injured*; Georgetown, *ice*; Sutton, *frost*; Scarborough\*, Wiarton, *frost*; DeCewsville, *heavy frost*; Stratford, *garden stuff damaged*; Truro, *frost*; Woodstock, *frost*; White River, 2 in.

30. Brome, *frost*; Clontarf, *frost*; Minden, *frost*; Welland, *frost*; Bancroft, *frost*; Peterborough, *ice*.

31. Owen Sound, *frost*.

*Migration of spring birds, &c.:*—

SWALLOWS.—Barrie, 6th; Alton, 1st; Bognor, 20th; Cottam, 1st; Haileybury, 1st; Scarborough, 1st; Burk's Falls, 13th; Qu'Appelle, 1st.

YELLOW BIRDS.—Barrie, 23rd; Bognor, 16th; Lucknow, 7th; Owen Sound, 18th; Thedford, 8th. WHITE-POOR-WILL.—Alton, 8th; Clontarf, 16th; Fort Ellice, 10th.

HUMMING BIRDS.—Bognor, 13th; Lucknow, 18th; Thedford, 12th; Spence's Bridge, 13th.

ORIOLES.—Cottam, 1st; St. Mary's, 6th; Owen Sound, 10th; Thedford, 9th.

WRENS.—Owen Sound, 6th; Thedford, 12th.

BLACK BIRDS.—Burk's Falls, 1st.

BOBOLINKS.—Scarborough, 14th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF MAY, 1894.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....		0.02	0.22	0.26	0.46	0.47	0.50	0.52	0.52	0.54	0.52	0.53	0.46	0.32	0.12	..
AGASSIZ .....		.04	.20	.25	.25	.28	.36	.33	.33	.41	.35	.39	.36	.26	.16	..
BRANDON .....		.10	.43	.54	.60	.70	.76	.72	.78	.74	.74	.59	.62	.64	.39	..
INDIAN HEAD .....		.16	.45	.55	.56	.59	.59	.53	.53	.52	.64	.54	.57	.47	.28	.01
WINNIPEG .....	.02	.32	.45	.57	.59	.69	.68	.68	.71	.71	.67	.67	.68	.64	.41	.03
WOODSTOCK .....		.02	.33	.48	.51	.52	.55	.52	.52	.50	.47	.38	.29	.28	.11	..
TORONTO .....		.11	.43	.43	.42	.46	.54	.53	.49	.51	.49	.45	.45	.30	.11	..
LINDSAY .....	.01	.26	.42	.40	.38	.42	.47	.45	.44	.48	.46	.50	.34	.27	.06	.8.
BARRE .....		.16	.38	.36	.44	.44	.44	.47	.55	.53	.48	.42	.36	.33	.07	..
KINGSTON .....		.31	.55	.60	.57	.64	.60	.60	.55	.51	.56	.53	.55	.45	.21	..
MONTREAL .....		.21	.42	.46	.50	.58	.58	.50	.64	.60	.52	.52	.50	.45	.03	..
FREDERICTON .....		.14	.24	.33	.35	.37	.39	.41	.45	.48	.48	.42	.41	.33	.21	.02
MEAN PROPORTION FOR MONTH .....					0.37	0.28	0.54	0.45	0.55	0.37	0.38	0.32	0.36	0.48	0.51	0.34
(Constant on every beam 4.)																
MAXIMUM DAILY AMOUNT .....		0.77	0.88	0.84	0.87	0.90	0.88	0.85	0.88	0.88	0.88	0.88	0.90	0.99	0.90	..
NO. OF DAYS COMPLETELY CLOUDED .....		24	24	18	30	22	12	7	13	9	10	14	13	7	7	..



## PROBABILITIES.

The probabilities issued by this office at 11 p. m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 540. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA .....	88	62	14	12	78.4
LOWER LAKE REGION.....	98	72	13	13	80.1
UPPER ST. LAWRENCE .....	88	67	11	10	82.4
LOWER ST. LAWRENCE.....	91	76	12	3	90.1
GULF.....	92	64	16	12	78.3
MARITIME PROVINCES .....	83	56	18	9	78.3
TOTAL .....	540	377	81	82	81.3

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The daily probabilities and storm warnings were issued by Probability Officer R. F. Stupart.

## STORM WARNINGS.

During the month warnings on the approach of two Storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 53, of which 53 or 100 per cent were verified. 6 stations reported warnings received late owing to delay in issue, 3 stations owing to delay in transmission, and 1 station reported a storm for which no warning was issued.

In connection with the warnings, predictions as to the probable directions of the wind were given, and of the 53 warnings as to force, 53 or 100 per cent were fully verified.

No. 1. All lake stations were warned to expect a fresh gale from the E. changing N. and N.W. Lake Superior stations at 10.30 p.m. on the 16th, and all other lake stations at 9.40 p.m. on the 17th. An important cyclone which had developed over the western states moved eastward crossing the lakes on the 17th and 18th and passed on to the Atlantic coast where it hovered and then backed to the lakes and dispersed. It caused a fresh to heavy gale from the N.E. and N. at most places; 60 miles per hour was recorded at Presqu'Isle on the Georgian Bay and 56 at Pelee Island. The agent at Sarnia reported an extraordinary rise of water there, at 7 a.m. on the 17th of 2 ft. 8½ in.; and then a fall of 1 ft. 6 in. below mean level of season, a range of 4 ft. 2½ in. All night of the 18th it blew a hurricane and at 3 p.m. on the 17th there was a furious hail storm. All stations along the Gulf of St. Lawrence, between Father Point and Miramichi Bay, were warned at 11 a.m. on the 18th to expect a moderate N.E. gale in advance of the above cyclone. A moderate easterly gale occurred in this district for a short time on the 19th.

No. 2. At 10 a.m. on the 27th Lake Huron and Georgian Bay stations were warned for a moderate N.W. to N. gale, there being at the time a depression over the lakes moving eastward. That evening and the following day a moderate N.W. gale prevailed in this district.

## TORONTO OBSERVATORY—MAGNETIC REVIEW FOR MAY, 1894.

A slight disturbance prevailed on the 1st, followed by two comparatively quiet days. Minor changes were registered on the morning of the 4th, also on the 7th, and on the night of the 8th the movements increased, but by 2 a.m. of the 9th the disturbance had passed off. A quiet period followed, continuing to the night of the 12th, when a slight disturbance commenced, but passed off in a short time. After 6 p.m. the following evening the magnets again became unsteady, slow waves of disturbance being registered. The 14th and 15th were also disturbed, the afternoon of the 14th being the most disturbed. On the nights of the 16th and 17th a slight disturbance existed. An easterly movement of the declination magnet was registered at 10.55 p.m. of the 19th. It

occurred again on the following night at nearly the same time, in both cases the disturbance had ceased by midnight. Slight disturbing action was noticed on the morning of the 21st and 22nd; the evening hours of the 22nd and 23rd were also slightly disturbed. From the 25th to the 27th the magnets were quiet. On the 28th slight disturbing action set in, and continued off and on to the end of the month.

On the 14th auroral light class (IV) was observed, on the 15th class III at 12.25, bright auroral light and streamers in N. N. E. tinged with green and red. And on the 28th faint auroral light in N. On the 1st, 2nd, 3rd, 4th, 7th, 8th, 9th, 11th, 22nd, 24th, 25th, 26th, 29th and 30th the sky was clear, but no aurora was observed, on all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Acting Director.*

METEOROLOGICAL OFFICE,  
Toronto, 3rd October, 1894.

# METEOROLOGICAL SERVICE, DOMINION OF CANADA.

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## Monthly Weather Review.

JUNE, 1894.

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### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### ATMOSPHERIC PRESSURE.

The greatest departure of the mean atmospheric pressure from the normal of the month was over the North-west and British Columbia districts; more especially over Alberta and British Columbia, where it was —1.0 below. It was about average over Ontario and Eastern Canada. There were no cyclones of much importance during the month, but an erratic cyclonic movement took place in the early part of the month, the centre first moving northwest across to the Lake Region, then north-eastward down the St. Lawrence Valley. There was also noticeable a very persistent continuance of cyclonic conditions over the North-west and British Columbian districts. The movements of cyclones were too uncertain in most cases to be definitely tracked. In the three cases where this was possible, the average movement was 21.5 miles per hour.

1st to 5th. The general pressure distribution from the Lakes to the Atlantic during this period was cyclonic; a cyclone which had backed in from the New England coast was central near Montreal on the 1st, from thence it moved north-westward to the north of the Ottawa Valley, then southward, and was central at night of the 2nd near the eastern end of Lake Ontario. Thence it passed slowly north-eastward, being over Labrador on the 5th. It was attended during the whole period by occasional rain and moderate temperatures, although there were some breaks of fine weather. In the North-west a slight depression passed eastward on the 1st, accompanied in Assiniboia and Manitoba by high temperatures. After this, until the 5th, the pressure was high in Manitoba and Assiniboia with fine weather and moderate temperatures, whilst somewhat lower pressure, extremely high temperatures and local showers prevailed in Alberta.

6th to 12th. The anti-cyclone from Manitoba and Assiniboia moved south-eastward to the south of the Lakes, where it became almost stationary until the 12th. There was a slight cyclonic development over the Lakes on the 7th, causing local rains there, and a cyclone of some importance passed across Nova Scotia, causing a heavy rainfall in the Maritime Provinces; but the weather soon cleared up and continued fine in most places until the 12th from the Lakes to the Atlantic; the exception being a few local showers in eastern Canada. The temperature in the Lake and Upper St. Lawrence districts was generally high and on the 11th and 12th was excessive in southern Ontario, maximum readings of 86° being reached; further east, however, moderate temperatures prevailed, the wind as a rule being moderate everywhere.

In the North-west district during the same period the pressure distribution was generally cyclonic, some local thunderstorms occurred in Alberta on the 7th with excessive local temperatures; but after that the temperature was more moderate there with westerly winds and fine weather.

12th to 16th there was little change in the relative distribution of pressure, a slight diminution occurred on the 12th over the Lake and St. Lawrence districts, but it soon recovered itself and the weather continued fine throughout.

In the North-west districts anti-cyclonic conditions obtained for a short time, but a general decrease in pressure soon followed, and occasional showers fell in all North-west districts.

17th to 23rd there was a moderate but general decrease in pressure on the 17th over the Lake and Eastern districts, and for the next two days showers occurred in Ontario and Quebec; then higher pressure set in with fine weather over the Lake district, but pressure continued low in eastern Canada until the 23rd. In the North-west, fair weather and low pressure prevailed. There were numerous thunderstorms with high temperatures in Manitoba, but temperatures were more moderate further west.

24th to 30th. On the 24th the cyclonic conditions in the North-west extended to the Lakes and very warm weather with local thunderstorms occurred in Ontario. Next day the pressure was generally low everywhere and continued so over the Lake and Eastern districts until the 28th, the weather being fair and very warm throughout, with moderate to fresh winds and local showers and thunderstorms. On the 28th there was a general increase in pressure over these districts, some heavy rains fell in Eastern Canada on the night of the 29th with a little lower temperature, but elsewhere the weather was fine and warm until the end of the month.

In the North-west districts low pressure continued with fine warm weather until the night of the 26th, when a further decrease in pressure took place accompanied by local showers in Alberta and Manitoba. On the 24th a well-formed depression was over Manitoba, causing a moderate gale and heavy rains in that province; then a slight increase in pressure took place, but local showers and thunderstorms were prevalent on the 29th and 30th throughout the North-west districts.

#### TEMPERATURE.

The average temperature was generally above the normal, except in some parts of the Maritime Provinces, where it was slightly below; in no case was the departure large, except in some parts of Manitoba and the North-west Territories, where  $6^{\circ}$  or  $7^{\circ}$  occurred, and at one station in British Columbia, where it was  $11^{\circ}$ .

*The Highest and Lowest Temperatures in each Province during June were :*

British Columbia,  $98^{\circ}0$  on 17th at Quesnelle;  $26^{\circ}0$  on 11th at Stuart's Lake.

North-west Territories,  $94^{\circ}5$  on 6th at Medicine Hat;  $28^{\circ}0$  on 4th at Glen Adelaide.

Manitoba,  $100^{\circ}5$  on 12th at St. Albans;  $21^{\circ}0$  on 5th at Fort Ellice.

Ontario,  $98^{\circ}0$  on 26th at Paris;  $27^{\circ}0$  on 6th at Savanne.

New Brunswick,  $91^{\circ}0$  on 16th at Dalhousie;  $36^{\circ}0$  on 11th at Dalhousie.

Nova Scotia,  $87^{\circ}0$  on 18th at Truro;  $30^{\circ}4$  on 13th at Sydney.

Prince Edward Island,  $81^{\circ}0$  on 22nd at Georgetown;  $40^{\circ}0$  on 12th at Georgetown.



PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT ALL STATIONS IN THE DOMINION OF CANADA, JUNE, 1894.

[illegible]

## ONTARIO—Continued.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87													

## PRECIPITATION.

The rainfall for the month of June was in general below the normal quantity, in some provinces the difference was very small.

*The General Distribution is as follows :—*

In British Columbia the rainfall was in general 2·87 in., or about 0·10 above 1893.

In the North-west Territories, 2·27 in., about 0·55 in. below the average.

In Manitoba the rainfall was 4·00 in., or 0·22 in. above the average.

In Ontario, West and South-west District, it was 1·73 in., or 1·26 in. below the average. In the North and North-west District it was 2·48 in., or 0·12 in. below the average. In the Central District it was 2·25 in., or 0·19 in. below the average; and in the East and North-east District it was 2·82 in., or 0·54 in. above the average.

In Quebec it was 2·71 in., or 0·26 in. below the average.

In New Brunswick it was 3·54 in., or 0·01 in. above the average.

In Nova Scotia it was 2·84 in., or 0·45 in. below the average.

In Prince Edward Island it was 3·04 in., or equal to the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA—Loch Erroch, 5·96 in.; New Westminster, 5·60 in.; Langley, 5·68 in.

MANITOBA—Elkhorn, 9·92 in.; Fort Ellice, 6·68 in.; Evandale, 6·19 in.; Roseberry, 6·03 in.; Arden, 7·41 in.; Pilot Mound, 6·86 in.; Manitou, 8·38 in.; Beaver Creek, 5·56 in.

ONTARIO—Ottawa, 5·36 in.; Uplands, 5·02 in.; Huntsville, 7·69 in.

QUEBEC—Quebec, 5·54 in.

NOVA SCOTIA—Pictou, 5·54 in.

NEWFOUNDLAND—Channell, 6·62 in.

*Rain one inch and upwards in 24 hours :—*

1. Port Hastings, 1·00 in.; Parker's Ridge, 1·99 in.; Digby, 1·00 in.; Dalhousie, 1·17 in.; Point des Monts, 1·40 in.; Quebec, 1·64 in.

2. Welland, 1·01 in.; Norwood, 1·15 in.; Durham, 1·00 in.

3. Salt Springs Island, 1·35 in.; Esquimalt, 1·18 in.; New Westminster, 1·07 in.; Banff, 1·10 in.

4. Quamichan, 1·00 in.

7. Port Hastings, 1·10 in.; Pictou, 1·70 in.

8. Channell, 1·64 in.; Whitehead, 1·50 in.; Bermuda, 1·56 in.

9. Union, 1·84 in.

10. Loch Erroch, 1·35 in.; Langley, 1·06 in.

12. Fort Ellice, 2·62 in.

13. Shoal Lake, 1·15 in.

14. Savanne, 1·20 in.

17. Clontarf, 1·20 in.; Aurora, 1·05 in.; Wilton Grove, 1 in.; Cowal, 1·12 in.; Belle Isle, 1·03 in.

18. Haileybury, 1·06 in.; Uplands, 1·13 in.; Sprucedale, 1·50 in.; Mattawa, 1·15 in.; Burk's Falls, 1·15 in.; Presque Isle, 1·50 in.; Coldstream, 1·03 in.

19. Clontarf, 1·32 in.; Haliburton, 1·01 in.; Renfrew, 1·63 in.; Channell, 1·36 in.; Huntsville, 3·50 in.; Richmond, 1·65 in. (in about 2 hours).

20. Ottawa, 1·64 in.; Elkhorn, 2·46 in.

22. Pembina Crossing, 2·10 in.; Pilot Mound, 1·05 in.; Elkhorn, 2·10 in.

23. Cartwright, 1·06 in.; Brandon, 1·00 in.; Foxton, 1·46 in.; Arden, 1·50 in.; Hartney, 1·49 in.; Rapid City, 1·62 in.; Scarborough, 2·11 in.; Brandon Exp. Farm, 1·40 in.; Richmond, — in.; Portage la Prairie, 1·45 in.

24. Barrie, 1·04 in., fell 2 to 3 p.m.; Huntsville, 1·19 in.; Sarnia, 1·82 in.; Courtright, 1·67 in.

25. Pelee Island, 1·00 in.; Birnam, 1·56 in.; Wyoming, 1·60.

26. Huntsville, 1·32 in.

27. Bancroft, 1·80 in.; Treherne, 1·65 in.; Arden, 2·00 in.; Belmont, 1·45 in.; Burk's Falls, 1·08 in.; Elkhorn, 1·01 in.

28. Channell, 1·15 in.; Cartwright, 1·00 in.; Treherne, 1·26 in.; Evandale, 1·97 in.; Rosebank, 2·07 in.; Norquay, 1·52 in.; Pembina Crossing, 2·71 in.; Foxton, 1·20 in.; Gretna, 1·04 in.; Beaver



Creek, 2'81 in. ; Carman, 1'78 ; Morden, 1'87 ; Abbotsford, 1'90 in. ; Loch Erroch, 1'08 in. ; Carmanah, 1'05 in. ; Emerson, 1'70 in. ; St. Albans, 1'79 in. ; Princeton, 1'00 in.

29. Cartwright, 1'20 in. ; Pilot Mound, 2'54 in. ; Langley, 1'22 in.

30. Fort Ellice, 1'71 in. ; Arden, 1'00 in. ; Halifax, 1'09 in. ; Elkhorn, 1'32 in.

*Thunder recorded on—*

1. Ridgetown, Richmond, Blenheim, Fort Steele, Pincher Creek.

2. Peterborough, Pelee Island, Brantford, Esquimalt, Carmanah, Emerson, Calgary, Agassiz, Hazlemere, Fort Steele, French Creek, Salt Spring Island, Loch Erroch, Beaver Creek, B.C., Langley, Port Stanley, Quebec, Stratford.

3. Savanne, Lucknow, Elora, Point Clark, Birnam, Alton, Stony Creek, Port Dover, Brantford, Thedford, Cowal, Sarnia, Wyoming, Mount Forest, Georgetown, Agassiz, Sproat Lake, Hazlemere, Fort Steele, Donald, Enderby, Loch Erroch, Glacier, St. John, Durham, Port Stanley, Banff, Toronto, Calgary, Paris, Pincher Creek.

4. Channell, Orillia, Lucknow, Point Clark, Gravenhurst, Port Rowan, Richmond, Parker's Ridge, Sunshine, Georgetown, Stuart's Lake, Halifax, Father Point.

5. Pelee Island, Sunshine, Fort Steele, Banff, Calgary, Pincher Creek.

6. Fort Steele, Edmonton, Banff, Calgary, Pincher Creek.

7. Sable Island, Orillia, Lucknow, Point Clark, Georgetown, Scarborough, Durham, Moose Jaw, Calgary.

8. Orillia, Sprucedale, Whiteside, Bancroft, Point Clark, Fort Ellice, Wiarton, Presque Isle, Lion's Head, French Creek, Saskatoon.

9. Pelee Island, Brandon, Oakbank, Parker's Ridge, Rapid City, Rosebank, Evandale, Treherne, St. Albans, Emerson, Portage la Prairie, Oonikup, Alameda.

10. Channell, Pelee Island, Pembina Crossing, Norquay, Moose Jaw, Oonikup, Alameda.

11. Lucknow, Point Clark, Birnam, Virgil, Pelee Island, Brantford, Oak Bank, Sunshine, Wyoming, Mount Forest, Merriton, Pembina Crossing, Norquay, Evandale, Treherne, Emerson, Portage la Prairie, Quebec, Grand Manan, Oonikup, Regina.

12. Cottam, Trenton, Haliburton, Lucknow, Peterborough, St. Mary's, Point Clark, Hillview, Birnam, Stony Creek, Gravenhurst, Uplands, Haileybury, Virgil, Pelee Island, Brandon, Oakbank, Burk's Falls, Belmont, Rapid City, Emerson, Portage la Prairie, Grand Manan, Moose Jaw, Oonikup, Regina, Toronto, Stratford.

13. Savanne, Fort Ellice, Brandon, Belmont, Shoal Lake, Oakbank, Hillview, Norquay, Roseberry, Brandon (2), St. Albans, Medicine Hat, Minnedosa, Moose Jaw, Oonikup, Regina, Alameda, Elkhorn.

14. Scarborough, Norquay, Barkerville, Minnedosa, Alameda, Elkhorn.

15. Cottam, Clontarf, Lucknow, Barrie, St. Mary's, Point Clark, Alton, Haileybury, Wyoming, Scarborough, Point Escuminac, Evandale, Toronto.

16. Lucknow, St. Mary's, Point Clark, Birnam, Stony Creek, Haileybury, Virgil, Bathurst, Chicoutimi, Georgina, Georgetown, Merriton, Fort Steele, Belle Isle, London, Moose Jaw, Toronto, Alameda, Pincher Creek.

17. Haliburton, Clontarf, Whiteside, Lucknow, Owen Sound, Peterborough, Welland, Beatrice, Bancroft, Barrie, St. Mary's, Conestogo, Elora, Point Clark, Birnam, Alton, Bognor, Uplands, Port Rowan, Ridgetown, Fort Ellice, Coldstream, Mount Forest, Georgetown, Wiarton, Presque Isle, Lion's Head, Georgina, Cowal, Dealtown, Wilton Grove, Sarnia, Wyoming, Coldstream, Sutton, Burk's Falls, Midland, Aurora, Rapid City, Shoal Lake, Pembina Crossing, Hillview, Durham, Belle Isle, Lindsay, London, Bathurst, Coldwater, Elkhorn, Medicine Hat, Grand Manan, Alameda, Stratford, Moose Jaw, Toronto.

18. Channell, Sprucedale, Haliburton, Clontarf, Whiteside, Peterborough, Welland, Beatrice, Bancroft, Barrie, Birnam, Gravenhurst, Bognor, Uplands, Fort Ellice, Truro, Brome, Georgina, Sunshine, Georgetown, Presque Isle, Huntsville, Burk's Falls, Scarborough, Spence's Bridge, St. Albans, Fort Steele, Durham, London, Ottawa, Coldwater, Kingston, Port Stanley, Moose Jaw, Saskatoon, Banff, Toronto, Calgary, Alameda, Paris.

19. Sprucedale, Haliburton, Clontarf, Welland, Bancroft, Uplands, Pelee Island, Brandon,

Digby, Richmond, Huntsville, Burk's Falls, Scarborough, Ennismore, Pembina Crossing, Evandale, Roseberry, Treherne, Brandon, St. Albans, Georgetown, Woodstock, Ottawa, Medicine Hat, Quebec, Henrietta, Regina, Alameda, Pincher Creek.

20. Trenton, Peterborough, Bancroft, Gravenhurst, Fort Ellice, Brandon, Oakbank, Georgina, Denbigh, Ennismore, Belmont, Shoal Lake, Hillview, Norquay, Rosebank, Evandale, Treherne, Turtle Mountain, Brandon, St. Albans, Portage la Prairie, Bathurst, Edmonton, Port Arthur, Banff, Alameda, Elkhorn.

21. Peterborough, Point Clark, Fort Ellice, Oakbank, Georgina, Shoal Lake, Alameda, Pembina Crossing, Arden, Norquay, Turtle Mountain, St. Albans, Portage la Prairie, Elkhorn.

22. Savanne, Lucknow, Owen Sound, Peterborough, Welland, St. Mary's, Conestogo, Point Clark, Birnam, Alton, Fort Ellice, Brandon, Oakbank, Thedford, Wilton Grove, Sarnia, Wyoming, Coldstream, Mount Forest, Georgetown, Point Escuminac, Merrittton, Belmont, Rapid City, Shoal Lake, Pembina Crossing, Hillview, Brandon, St. Albans, Portage la Prairie, London, Medicine Hat, Moose Jaw, Oonikup, Alameda, Elkhorn.

23. Sable Island, Channell, Whiteside, Owen Sound, Peterborough, Welland, Barrie, Conestogo, Elora, Point Clark, Birnam, Alton, Stony Creek, Gravenhurst, Bognor, Virgil, Oakbank, Richmond, Georgina, Thedford, Wyoming, Mount Forest, Wiarton, Presque Isle, Lion's Head, Scarborough, Midland, Aurora, Belmont, Rapid City, Shoal Lake, Hillview, Norquay, Thompson, St. Albans, St. John, Lindsay, London, St. Andrews, Truro, Toronto, Paris, Stratford.

24. Spence, Sprucedale, Haliburton, Clontarf, Lucknow, Owen Sound, Peterborough, Welland, Beatrice, Bancroft, St. Mary's, Elora, Point Clark, Birnam, Gravenhurst, Bognor, Uplands, Port Rowan, Virgil, Pelee Island, Oakbank, Georgina, Thedford, Sarnia, Wyoming, Coldstream, Waterford, Mount Forest, Georgetown, Wiarton, Presque Isle, Huntsville, Lion's Head, Sutton, Burk's Falls, Ennismore, Midland, Aurora, Rapid City, Norquay, St. Albans, Woodstock, Conestogo, Lindsay, London, Ottawa, Coldwater, Calgary, Kingston, Port Stanley, Oonikup, Toronto, Calgary, Paris.

25. Cottam, Lucknow, Peterborough, Bancroft, St. Mary's, Birnam, Port Rowan, Ridgetown, Pelee Island, Oakbank, Chicoutimi, Thedford, Blenheim, St. Albans, Emerson, Durham, Deseronto, Port Stanley, Stratford.

26. Channell, Spence, Sprucedale, Haliburton, Clontarf, Peterborough, Beatrice, Birnam, Gravenhurst, Uplands, Port Rowan, Pelee Island, Oakbank, Richmond, Georgina, Denbigh, Wiarton, Presque Isle, Huntsville, Lion's Head, Burk's Falls, Ennismore, Carman, Pembina Crossing, Rosebank, Evandale, Treherne, Emerson, Deseronto, Ottawa, Quebec, Parry Sound, Toronto.

27. Port Rowan, Norwood, Oakbank, Chicoutimi, Georgina, Merrittton, Shoal Lake, Pembina Crossing, Hillview, Norquay, Rosebank, Thompson, Evandale, Treherne, Portage la Prairie.

28. Cottam, Spence, Sprucedale, Haliburton, Lucknow, Owen Sound, Peterborough, Beatrice, Bancroft, Alton, Bognor, Uplands, Ridgetown, Oakbank, Dealtown, Georgina, Georgetown, Wiarton, Burk's Falls, Carman, Pembina Crossing, Norquay, Thompson, Portage la Prairie, Durham, Port Stanley, Alameda, Stratford.

29. Bancroft, Point Clark, Port Rowan, Oakbank, Georgetown, Rapid City, Pembina Crossing, Hillview, Norquay, Rosebank, Evandale, Treherne, Brandon, St. Albans, Ottawa, Quebec, Oonikup, Alameda.

30. Brandon, Oakbank, Huntsville, Hillview, Norquay, Treherne, Emerson, Deseronto, London, Medicine Hat, Father Point, Moose Jaw, Alameda, Chaplin, Elkhorn.

*Aurora recorded*

Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.

1. Georgina, Hillview, III; Pembina, IV; Point Escuminac, II; Portage la Prairie, Moose Jaw.

2. Halleybury, III; Gravenhurst, IV; Barrie, Mattawa, Georgetown, IV; Huntsville, Pembina Crossing, II; Point Escuminac, III; Georgetown, P.E.I., Emerson, II; Truro, IV.

3. Halleybury, IV; Owen Sound, Savanne, Pembina Crossing, III; Oakbank, Point Escuminac, IV.

4. St. Albans, IV ; Port Arthur, III ; Elkhorn, IV.
5. Gravenhurst, IV ; Savanne, Thedford, IV ; Minnedosa, IV.
8. Haileybury, IV ; Shoal Lake, IV ; Pembina Crossing, III ; Point Escuminac, II ; Minnedosa, IV ; Father Point, IV ; Elkhorn, I.
9. Gravenhurst, III ; Conestogo, Barrie, Georgetown, III ; Midland, II ; Hillview, II ; Pembina Crossing, II ; Brandon, IV ; Point Escuminac, III ; Georgetown, P.E.I., Emerson, IV ; Ottawa, III ; Coldwater, Port Dover, IV ; Charlottetown, II ; Truro, III ; Moose Jaw, IV ; Toronto, II.
10. Haileybury, III ; Savanne, Thedford, IV ; Georgetown, IV ; Pembina Crossing, IV ; Truro, IV ; Dalhousie, Georgetown, P.E.I., Port Arthur, II ; Yarmouth, Father Point, III.
11. Hillview, IV ; Portage la Prairie, St. Albans, IV.
12. Pembina Crossing, IV ; Esquimalt, IV.
13. Belle Isle, II.
14. Hillview, II.
15. Savanne.
16. Elkhorn, I.
17. Savanne, Pembina Crossing, IV.
18. Pembina Crossing, IV.
19. Pembina Crossing, IV.
20. Savanne.
21. Haileybury, IV ; Esquimalt, IV ; Saskatoon, IV ; Moose Jaw, IV.
22. Kingston, II ; Truro, IV ; Moose Jaw, IV.
23. Haileybury, IV ; Pembina Crossing, IV.
24. Gravenhurst, IV ; Thedford, III ; Belle Isle, II ; Truro, IV.
25. Gravenhurst, IV ; Savanne, Pembina Crossing, III.
26. Haileybury, IV.
28. Chicoutimi, IV.
29. Savanne, Belle Isle, I ; Kingston, I.
30. Gravenhurst, IV ; Clontarf, IV ; Georgetown, IV ; Port Arthur, II ; Moose Jaw, IV.

*Frost or Snow recorded on the following dates.*

3. Pilot Bay, Woodstock.
4. White River, 07 in. snow.
5. Richmond, 31° ; Brome, 32° ; Oakland, 35° ; Brandon, 28° ; Shoal Lake, 21° ; Fort Ellice, *very severe*, Brandon, Turtle Mountain, *potatoes frozen down* ; Treherne, 29° ; Rosebery, *severe* ; Evandale, *severe* ; Norquay, *severe* ; Gretna, Hillview, *ice 1 1/4 in* ; Oak River, *grain frozen* ; Arden, Pilot Mound, Shoal Lake, *wheat, oats, &c., frozen* ; Rapid City, Belmont, Ennismore, Burk's Falls, 6 inches *snow* 6 in. *ice* ; Warton, Georgetown, *ice* ; Mount Forest, Denbigh, Sarnia, *potatoes and grapes hurt* ; Wyoming, *severe* ; Georgina, Orillia, 32° Upland, *snow* ; White River, *snow* ; Alameda, 28° Elkhorn, 24°.
6. Alameda, 29° ; Stratford, Courtright, 32° ; Cottam, *ice* ; Mattawa, Savanne, 27° ; Spence, 31° ; Sprucedale, 30° ; Haliburton, 32° ; Barrie, St. Mary's, Conestogo, Elora, 24° ; Sault St. Marie, 30° ; Lucknow, 30° ; Owen Sound, Peterborough, *ice* ; Welland, Bancroft, 31° ; Birnam, 31° ; Alton, Gravenhurst, Uplands, 30° ; Haileybury, Chatham, Port Rowan, Ridgetown, 28° ; Brantford, 32° ; London, *heavy* ; De Cewsville.
7. Woodstock, De Cewsville.
10. Pictou, Barkerville, 29° ; Calgary, 31°.
11. Pictou, Stuart's Lake, 26 ; Fort Steele, 29° ; Calgary.
12. Digby.
13. Truro, *hazy*.
22. Donald, 30° ;
25. Princeton, 32°.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF JUNE, 1894.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....		0 03	0 10	0 23	0 36	0 45	0 50	0 57	0 64	0 64	0 67	0 71	0 65	0 53	0 23	..
AGASSIZ .....	02	09	24	30	34	38	42	44	40	42	37	40	43	28	15	..
INDIAN HEAD .....	..	17	49	59	71	74	78	82	74	74	63	57	57	52	43	09
BRANDON .....	..	19	55	67	71	78	75	78	90	84	82	76	72	67	52	04
WINNIPEG .....	05	45	55	56	65	78	81	84	89	82	80	81	74	73	61	13
WOODSTOCK .....	..	14	32	63	73	74	73	77	75	73	71	72	72	64	29	8.
TORONTO .....	..	24	51	68	67	72	75	70	74	80	72	70	69	57	23	..
LINDSAY .....	04	29	48	61	62	66	65	63	59	62	62	59	56	51	20	10
BARRIE .....	S.	18	48	61	60	64	61	59	64	60	62	61	58	45	28	08
KINGSTON .....	..	20	37	46	54	60	64	70	74	73	70	71	60	44	28	..
MONTREAL .....	..	14	46	59	51	47	21	16	14	16	18	29	49	43	12	..
FREDERICTON .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
<hr/>																
				ESQUIMAULT.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.	
MEAN PROPORTION FOR MONTH (Constant sunshine being 1.)				0.38	0.31	0.53	0.60	0.62	0.57	0.56	0.51	0.48	0.50	0.30	..	
MAXIMUM DAILY AMOUNT .....				0.76	0.88	0.92	0.88	0.89	0.88	0.86	0.97	0.96	0.88	0.71	..	
DATE .....				1	1	5	15	15	30	30	30	29	30	7	..	
NO. OF DAYS COMPLETELY CLOUDED .....				4	10	2	1	0	1	1	1	2	2	5	..	

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 539. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	84	66	8	10	83.3
LOWER LAKE REGION .....	104	82	13	9	85.1
UPPER ST. LAWRENCE .....	85	58	10	17	74.1
LOWER ST. LAWRENCE .....	85	63	11	11	80.6
QUEBEC .....	86	57	19	10	77.3
MARITIME PROVINCES .....	95	72	11	12	81.6
TOTAL .....	539	398	72	69	80.5

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer H. V. Payne.

## STORM WARNINGS.

No storm warnings were issued during the month, and no storm was reported as having occurred.

### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR JUNE, 1894.

A slight disturbance prevailed during the first three days of the month. A marked increase in the westerly movements of the declination was registered at 2 p.m. of the 1st, and 2.05 a.m. of the 3rd. After 8 a.m. of the 8th, the magnets became steadier and remained comparatively so up to the morning of the 9th, when a slight disturbance sprang up: it became more about active 8 p.m., and a little after 11 p.m. there were some very rapid changes of the declination magnet recorded. The disturbance abated considerably at midnight, recommenced again at 1.40 a.m. of the 10th, an easterly sweep of 50' being then registered in a short time, the minimum taking place at 2.12 a.m. This disturbance continued to 6 a.m., when it became less active. At 9.20 a.m. of the 10th, a marked westerly swing of 25' was registered. On the night of the 10th, the declination was considerably disturbed. After 8 p.m. of the 9th both components of the force decreased, and some quick changes were registered up to 6 a.m., after which slow waves of disturbance continued up to midnight of the 10th. About 5.40 a.m. the v. f. commenced steadily to increase, continuing up to 2 p.m., decreasing slightly during the night. On the morning of the 14th, a slight disturbance appeared, and continued off and on to the end of the month becoming more important between 4.25 and 7 a.m. of the 21st. The declination magnet was then recording slow waves of disturbance, while the horizontal component decreased and subsequently increased between noon and 4 p.m.

On the 9th aurora Class II, was observed. At 9.30 it had the appearance of smoke or vapour passing rapidly towards the zenith. Previous to this it was impossible to distinguish it owing to the thick haze. At 10.15 it assumed a brighter appearance, there being clumps of streamers reaching to the zenith. It gradually faded until at midnight it was almost impossible to distinguish it. On the 2nd, 3rd, 5th, 6th, 7th, 11th, 12th, 13th, 16th, 18th, 20th, 21st, 22nd, 23rd 25th, 27th, 29th and 30th the sky was clear. On all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,

*Acting Director.*

METEOROLOGICAL OFFICE,

Toronto, October, 1894.

ABSTRACT OF OBSERVATIONS AT HAY RIVER, GREAT SLAVE LAKE, BY THE REV. THOMAS J. MARSH, FROM SEPTEMBER, 1893, TO JUNE, 1894.

	SEPTEMBER, 1893	OCTOBER.	NOVEMBER.	DECEMBER.	JANUARY, 1894.	FEBRUARY.	MARCH.	APRIL.	MAY.	JUNE.
MEAN TEMPERATURE ..		23.0	4.4	-26.3	-25.9	-10.2	-3.0	14.6	41.7	51.8
MEAN HIGHEST TEMPERATURE ..		37.4	12.1	-17.4	-20.0	-5.4	11.4	25.4	52.4	61.7
MEAN LOWEST do ..		20.6	-3.3	-35.2	-31.7	-17.1	-17.4	3.7	31.1	41.9
HIGHEST do ..	60.0	55.0	45.0	-4.0	8.0	30.0	37.0	60.0	85.0	87.0
LOWEST do ..	19.0	2.0	-37.0	-47.0	-54.0	-47.0	-40.0	-25.0	10.0	29.0
MEAN DAILY RANGE ..		16.8	15.4	17.8	11.7	13.7	28.9	21.7	21.4	19.8
GREATEST DAILY RANGE ..		27.0	32.0	29.0	32.0	36.0	55.0	62.0	45.0	49.0
MEAN AMOUNT OF CLOUD ..		0.7	0.5	0.4	0.4	0.6	0.3	0.6	0.6	0.5
DIRECTION OF WIND FROM	N ..	10	3	8	16	19	7	14	16	17
	NE ..	4	0	3	6	3	1	4	5	5
	E ..	4	1	1	1	1	7	5	13	16
	SE ..	11	9	4	10	6	4	16	8	6
	S ..	16	15	6	8	3	14	5	14	10
	SW ..	6	7	5	1	2	1	2	2	0
	W ..	4	9	2	7	7	3	2	2	1
	NW ..	1	16	9	13	15	8	12	2	5
	C ..	0	0	0	0	0	0	0	0	0
NUMBER OF OBSERVATIONS ..		50	60	38	62	56	45	60	62	60
RAINFALL IN INCHES ..	0.16								0.11	2.03
NUMBER OF DAYS ..	1								1	7
NUMBER OF AURORAS ..	1	4	6	1	3	2	3	0	0	0

Observations commenced Sept. 18th, 1893. Sept. 18th, first snow of season; 21st, snowed a little; 23rd, snowed a little. Oct. 12th, a little snow; 13th, a little snow. Nov. 1st, 2 inches of snow; 3rd, first entry below zero, snowed hard; 4th, snowed plenty; 12th, terrible gale all day; 18th, 2½ inches of snow; 26th, a little snow. 1894—March 8th, first time thermometer recorded above 32°. April 22nd, no sleighing after this date except upon the ice. May 9th, first rain of year 0.11 in. June 11th, a little snow.

# METEOROLOGICAL SERVICE, DOMINION OF CANADA.

## Monthly Weather Review.

JULY, 1894.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### ATMOSPHERIC PRESSURE.

The mean pressure in July was from '01 to '03 above average in nearly all parts of the Dominion. The only station which shows a larger excess than this is Esquimalt, B.C., which was '06 above, and the only stations which showed a mean below average, in each case '01, were White River and Edmonton. In the United States the excess was generally somewhat larger than in Canada and a zone of pressure from '04 to as much as '10 above is apparent from South Carolina west-north-westward to the North Pacific States. Bermuda showed an excess of '10.

The month opened with indications of the development of feeble depressions north of the Lake Region and over the Upper Mississippi Valley, elsewhere the pressure was either normal or above. On the 2nd the greatest depression, more marked than on the previous day, was immediately over the Lake Region where numerous showers and thunder-storms occurred; after this it was transferred slowly across the St. Lawrence Valley, where on the 3rd and 4th showers and thunder storms were fairly general and on the 5th passed eastward across the Gulf. A small anticyclone which followed brought somewhat cooler weather both in the Lake Region and St. Lawrence Valley on the 4th and 5th.

Another small depression which on the 4th covered Manitoba where it gave thunder-storms, passed across Lake Superior on the 5th and on the 6th across the Lower Lakes to the St. Lawrence Valley giving pretty general thunder-storms. During the next two days it hovered and gradually dispersed over the Maritime Provinces, there giving a few local showers. The area of high pressure which followed this depression moved slowly, and in the Lake Region and St. Lawrence Valley brought much lower temperature than had occurred for some weeks, maxima less than 60° being recorded at many places on both 7th and 8th.

Low pressure over northern Alberta and Saskatchewan from 5th to 9th gave a southerly and south-westerly wind gradient over Manitoba and the Territories and very warm weather prevailed. On the 10th a more pronounced cyclonic development occurred somewhat further south and the storm centre then moved eastward, local rains occurring with a change to cooler weather both in Manitoba and the Territories. This depression passed across the lakes and eastward to the Gulf of St. Lawrence causing a few local thunder-storms on the 11th and 12th.

From the 13th to the 18th the pressure was generally below average and temperature above over the North-west Territories, and during the same period the pressure was high over Canada from the lakes eastward, with fine weather and temperature not far from normal.

A rapid increase in pressure occurred over the North-west Territories on the 19th and the low pressure moving quickly east was absorbed in a general decrease which was setting in over the Lake Region and St. Lawrence Valley from the northward. With a south-west barometric gradient, on the 19th and 20th, the weather was very warm both in Ontario and Quebec, and a few local thunder-storms occurred. During the night of the 20th, however, the low pressure, at that time an extended trough lying north-east and south-west, moved to the Atlantic coast and cool northerly

winds with a more general rain prevailed in both provinces. During the 21st and 22nd the pressure over Canada from the Lakes eastward steadily increased, and the depression drew southward to the Middle Atlantic States.

The increase in pressure over the North-west Territories, on the 19th, was very temporary and from the 20th until the last day of the month the pressure was almost constantly below average and weather fine and decidedly warm, a few thunder-storms were reported but they were very local.

A shallow but extensive depression which can be traced from the North-west Territories, on the 24th, moved over the Lake Region and down the St. Lawrence Valley, giving frequent and heavy showers during the day in Ontario and Quebec and at night in the Maritime Provinces. After this the pressure was higher for two days and then decreased again, but the weather continued fine until the end of the month, except in Quebec and northern New Brunswick, where on the 29th and 30th there were heavy local rains as the centre of a depression passed south-eastward across the Gulf of St. Lawrence.

#### TEMPERATURE.

The average temperature was generally above the normal, the greatest excess occurring in the North-west Territories and Manitoba.

*The Highest and Lowest Temperatures in each Province during July were :*

British Columbia, 100°·0 on 13th at Spence's Bridge ; 28°·0 on 10th at Stuart's Lake.

North-west Territories, 104°·0 on 20th at Moose Jaw ; 30°·4 on 31st at Banff.

Manitoba, 105°·0 on 15th at Fort Ellice ; 34°·0 on 4th at Oak Bank.

Ontario, 101°·0 on 19th at Cottam and Thorold ; 30°·7 on 8th at Sault Ste. Marie.

Quebec, 93°·0 on 2nd at Richmond ; 43°·0 on 16th at Brome.

New Brunswick, 92°·7 on 29th at St. Andrews ; 44°·0 on 27th at Dalhousie.

Nova Scotia, 93°·0 on 29th at Pictou and Halifax ; 36°·9 on 24th at Sydney.

Prince Edward Island, 90°·4 on 27th at Georgetown ; 49°·3 on 27th at Georgetown.









## PRECIPITATION.

The rainfall throughout the Dominion with the exception of the Province of Quebec has been so much under the average as to cause general complaint as to root crops, fruit and pasture. In Quebec the amount was not only above the average, but it was extended over a larger number of days than usual.

*The Distribution is as follows :—*

In British Columbia, it was 0·82 in., or 0·53 in. below the average.

In the North-west Territories, it was 0·71 in., or 2·00 in. below the average.

In Manitoba, it was 0·66 in., or 2·34 in. below the average.

In Ontario, West and South-west District, it was 1·54 in., or 1·92 in. below the average. In the North and North-west District it was 1·46 in., or 1·28 in. below the average. In the Central District it was 1·75 in., or 0·97 in. below the average ; and in the East and North-east District it was 2·15 in., or 0·75 in. below the average.

In Quebec it was 4·44 in., or 0·11 in. below the average.

In New Brunswick it was 2·35 in., or 1·57 in. below the average.

In Nova Scotia it was 1·59 in., or 2·13 in. below the average.

In Prince Edward Island it was 1·84 in., or 2·22 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

Quebec,— Chicoutimi, 7·18 in. ; Cape Chatte, 6·27 in. ; Cape Magdalen, 6·35 in. ; Quebec, 6·67 in.

Newfoundland,— Channell, 5·16 in.

*Rain one inch and upwards in 24 hours :—*

1. Whitehead, 1·20 in.
3. Biequet, 1·10 in. ; Dalhousie, 1·53 in. ; Father Point, 1·10 in.
4. Channell, 1·00 in. ; Quebec, 1·13 in.
13. Point Escuminac, 1·46 in.
14. Hailebury, 1·01 in.
15. Port Dover, 1·41 in.
17. Thedford, 1·05 in.
19. Chicoutimi 1·69 in.
20. Welland, 1·44 in. ; Virgil, 1·62 in. ; Stony Creek, 1·02 in.
21. Thorold, 1·56 in.
23. Birnam, 1·07 in. ; Cowal, 1·65 in.
24. Elora, 2·60 in. ; Wilton Grove, 1·10 in. ; Conestogo, 1·00 in. ; Abbotsford, 1·24 in. ; Woodstock, 1·00 in. ; London, 1·14 in. ; Alton, 1·14 in.
25. Loch Erroch, 2·15 in.
28. Haliburton, 1·00 in. ; Glastonbury, 1·00 in. ; Port Arthur, 1·55 in.
29. Quebec, 1·24 in.
30. Cape Chatte 1·10 in.

*Thunder recorded on*

1. Channell, Point Lepreaux, Pictou, Georgetown, Point Escuminac, Peterborough, Gravenhurst, Norquay, Beatrice, Georgetown, Ont., Burk's Falls, Midland, Halifax, Truro, London, Barrie.
2. Clontarf, St. Hyacinthe, Chicoutimi, Pelee Island, Peterborough, Sprucedale, Uplands, Bognor, Gravenhurst, Beatrice, Orillia, Scarboro, Thedford, Toronto, Sunshine, Huntsville, Burk's Falls, Midland, Mount Forest, Warton, Lion's Head, Wyoming, Denbigh, Bancroft, Haliburton, Virgil, Norwood, Trenton, Birnam, St. Mary's, Spence, Georgina, Kingston, Prince Albert, Father Point, Pary Sound, Stratford, Durham, Lindsay, Haileybury, Alton, Barrie.
3. Shamonville, Richmond, Peterborough, Oliver's Ferry, Port Rowan, Trenton, Emerson, Pincher Creek, Father Point, London.
4. Fort Steele, Chilcotin, Brome, Pilot Mound, Pembina Crossing, Hillview, Belmont, Rathwell, Treherne, Brantford, Port Rowan, Emerson, Brandon, St. Albans, Stony Mountain.
5. Fort Steele, Georgetown, Moose Jaw, Norquay, Orillia, Lindsay.
6. Moose Jaw, Saskatoon, Princeton, Richmond, Brome, Sprucedale, Stony Creek, Toronto, Gravenhurst, Point Clark, Brantford, Thedford, Oliver's Ferry, Coldstream, Sutton, Burk's Falls, Wilton Grove, Denbigh, Port Rowan, Paris, Welland, Birnam, St. Mary's, Emerson, Merritton,

Georgina, Port Stanley, Parry Sound, Woodstock, Stratford, Durham, London, Alton.

7. Moose Jaw, Emerson, Banff, Kingston.

8. Georgetown, Moose Jaw, Medicine Hat.

9. Chilcotin, Stony Mountain, Peterborough, Bognor, Moose Jaw, Pembina Crossing, Hillview, Rosebank, Fort Ellice, Wiarton, Brandon, St. Albans, Spence's Bridge, Elkhorn.

10. Calgary, Savanne, Chicoutimi, Peterborough, Bognor, Pembina Crossing, Hillview, Belmont, Arden, Rosebank, Point Clark, Beatrice, Brantford, Scarboro, Thedford, Georgetown, Ont., Aurora, Bancroft, Haliburton, Welland, Norwood, Toronto, Owen Sound, Portage la Prairie, Brandon, Merritton, Georgina, Elkhorn, Lindsay, Alton, Barrie.

11. Alameda, Calgary, Peterborough, Sprucedale, Uplands, Bognor, Pembina Crossing, Selkirk, Rosebank, Point Clark, Brantford, Thedford, Sutton, Burk's Falls, Elora, Whiteside, Welland, St. Mary's, Emerson, Father Point, Parry Sound, Stratford, Toronto, Haileybury, Barrie.

12. Peterborough, Moose Jaw, Norquay, Rosebank, Thedford, Thompson, Father Point, Mount Forest, Paris, Welland, Owen Sound, Oakbank, Saugeen, Ottawa, Georgina, Parry Sound, Durham, Lindsay, Barrie.

13. Richmond, Brome, Sprucedale, Uplands, Pembina Crossing, Belmont, Norquay, Rathwell, Treherne, Oliver's Ferry, Huntsville, Bancroft, Welland, Emerson, Oakbank, Portage la Prairie, St. Albans, Georgina, Parry Sound, Ottawa, Mattawa.

14. Pelee Island, Moose Jaw, Point Clark, Thedford, Welland, Oakland, Quebec.

15. Chilcotin, Denbigh, Welland, Oakbank, Spence's Bridge, Kingston, Port Stanley, Port Dover, Stratford, Spence's Bridge, Toronto, Mattawa.

16. Saskatoon, Shannonville, Arden, Point Clark, Georgetown, Ont., Mount Forest, Wyoming, Paris, Oakbank, Pincher Creek, Channel Island, Woodstock, Alton.

17. Fort Steele, Pembina Crossing, Thedford, Wilton Grove, Birnam, Deseronto.

18. Oonikup, Chicoutimi, Mellendean, Belmont, Treherne, Emerson, Oakbank, St. Albans, Father Point, Woodstock, Deseronto, Alton.

19. Hazlemere, Calgary, Chicoutimi, Cottam, Norquay, Banff, Digby, Father Point.

20. Alameda, Digby, Cape Chatte, Clontarf, Chicoutimi, Richmond, Pelee Island, Peterborough, Sprucedale, Blenheim, Scarboro, Thedford, Burk's Falls, Kingston, Wyoming, Elora, Whiteside, Birnam, Emerson, Merritton, Father Point, Parry Sound, Stratford, Toronto, Bathurst, London, Lindsay, Alton.

21. Channell, Pictou, Georgetown, Brome, Peterborough, Pembina Crossing, Belmont, Port Rowan, Paris, Welland, Charlottetown, Truro.

22. Moose Jaw Truro.

23. Thedford, Cowal, Channel Island.

24. Mellendean, Point Clark, Scarboro, Thedford, Cowal, Georgetown, Ont., Sutton, Midland, Dealtown, Elora, Whiteside, Paris, Owen Sound, Georgina, Port Arthur, Port Stanley, Stratford, Toronto, Alton.

25. Barkerville, Moose Jaw, Calgary, Princeton, Pense, Chicoutimi, Sprucedale, Gravenhurst, Hillview, Belmont, Treherne, Turtle Mountain, Fort Ellice, Port Stanley, Parry Sound, Woodstock, Elkhorn, Ottawa, London.

26. Pembina Crossing, Belmont, Norquay, Arden, Treherne, Emerson, Deseronto.

27. Henrietta, Cape Chatte, Pembina Crossing, Norquay, Thompson, Channel Island.

28. Oonikup, Biscotasing, Clontarf, Point Clark, Wilton Grove, Haliburton, Merritton, Port Arthur, Ottawa, Haileybury.

29. Channell, Pictou, Georgetown, Brome, Pelee Island, Sprucedale, Uplands, Stony Creek, Hillview, Oliver's Ferry, Coldstream, Burk's Falls, Wyoming, Bancroft, Norwood, Birnam, St. Mary's, Grindstone, Stratford, Woodstock, Elkhorn, Ottawa, Lindsay, Haileybury.

30. Henrietta, Brome, Turtle Mountain, Chatham, Bancroft, Ottawa, Truro, Mattawa.

31. Thedford, Elkhorn.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (II'), the feeblest in brilliancy.*

1. Georgina, St. Albans, IV ; Brandon, IV ; Pincher Creek, II ; Burk's Falls, IV ; Georgetown, Ont., IV ; Pembina Crossing, I ; Shoal Lake, Clontarf, IV ; Alameda, IV ; Moose Jaw, IV ; Quebec, IV ; Kingston, I ; Elkhorn, II ; Toronto, IV.

2. Hillview, III ; Pembina Crossing, IV ; Moose Jaw, IV ; Elkhorn, II ; Truro, IV.

3. Pembina Crossing, Moose Jaw, IV ; Esquimalt, IV.
4. Portage la Prairie, Hillview, III ; Moose Jaw, IV ; Elora, Pembina Crossing, IV ; Belmont, Saskatoon, II ; Alameda, IV ; Kingston, I ; Toronto, IV.
5. St. Albans, IV ; Channel Island, IV ; Hillview, III ; Moose Jaw, IV ; Pembina Crossing, Calgary, III ; Alameda, IV ; Moose Jaw, Father Point, III.
6. Channel Island, IV ; Hillview, IV ; Pembina Crossing, Shoal Lake, Savanne. Moose Jaw.
7. Channel Island, III ; Pincher Creek, Emerson, IV ; Pembina Crossing, I ; Belmont, Treherne, Savanne, Calgary, II ; Alameda, IV ; Moose Jaw, Quebec, III.
8. Moose Jaw, Port Arthur, III ; White River, II ; Haileybury, III.
9. Pembina Crossing, IV ; Point Escuminac, IV ; Savanne, Haileybury, IV.
10. Moose Jaw, IV ; Pembina Crossing, IV ; Haileybury, IV.
12. Channel Island, IV.
13. Kingston, I.
14. Savanne, Moose Jaw, Quebec, III ; Father Point, III ; Medicine Hat, III ; Haileybury, II.
15. Hillview, II ; Moose Jaw.
16. Hillview, III ; Pembina Crossing, II ; Channell, IV ; Moose Jaw, Deseronto, I.
17. Point Escuminac, Channell, III ; Truro, III.
19. Fort Ellice, III ; Moose Jaw, IV ; Pembina Crossing, IV ; Edmonton, III ; Medicine Hat, IV.
20. Channel Island, IV ; Georgetown, Savanne, Channell, IV ; Father Point, Yarmouth, IV ; Truro, II.
21. Quebec, III.
22. Haileybury, IV.
23. Channel Island, III ; Kingston, I ; Haileybury, IV.
24. Edmonton, III.
26. Hillview, IV ; Moose Jaw, IV ; Quebec, IV ; Truro, IV.
28. St. Albans, IV ; Fort Ellice, III ; Hillview, IV ; Elora, Pembina Crossing, IV ; Moose Jaw, IV ; Toronto, IV.
29. Hillview, IV ; Chicoutimi, Moose Jaw, IV.
30. St. Albans, II ; Oakbank, Burk's Falls, IV ; Chicoutimi, Haileybury, IV.
31. Hillview, IV ; Saskatoon, IV ; Moose Jaw, IV ; White River, II.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF JULY, 1894.

	HOURS ENDING															
	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.		P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
ESQUIMAULT .....	..	0.22	0.55	0.54	0.79	0.82	0.83	0.96	0.84	0.84	0.84	0.84	0.80	0.78	0.40	..
AGASSIZ .....	..	0.08	.51	.64	.71	.80	.78	.83	.85	.89	.90	.85	.78	.76	.42	..
INDIAN HEAD .....	S.	.35	.55	.72	.84	.83	.82	.81	.81	.80	.83	.78	.67	.56	.27	.06
BRANDON .....	..	.07	.55	.77	.84	.82	.85	.83	.84	.86	.90	.90	.74	.67	.45	..
WINNIPEG .....	..	.38	.64	.72	.80	.79	.76	.74	.73	.75	.79	.84	.85	.73	.43	.10
WOODSTOCK .....	S.	.28	.57	.73	.72	.81	.85	.85	.80	.86	.84	.77	.74	.66	.41	..
TORONTO .....	..	.28	.66	.71	.68	.69	.69	.71	.69	.71	.73	.60	.63	.59	.20	..
LINDSAY .....	S.	.32	.50	.62	.68	.70	.69	.70	.68	.73	.66	.70	.57	.54	.14	.12
BARRIE .....	S.	.30	.55	.62	.68	.71	.75	.75	.79	.81	.75	.73	.75	.76	.61	.29
KINGSTON .....	..	.23	.57	.65	.74	.72	.76	.71	.73	.74	.66	.66	.66	.56	.27	.8.
MONTREAL .....	..	.24	.47	.50	.52	.63	.64	.57	.64	.66	.67	.63	.60	.48	.10	..
FREDERICTON .....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)						0.64	0.63	0.62	0.64	0.63	0.65	0.56	0.57	0.50	0.57	0.56
MAXIMUM DAILY AMOUNT.....						0.81	0.85	0.80	0.84	0.91	0.90	0.89	0.93	0.91	0.86	0.98
DATE.....						13	11	1	29	1	22	22	22	9	1	22
NO. OF DAYS COMPLETELY CLOUDED.....						2	2	0	0	0	0	0	0	0	0	0

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 578. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA .....	81	70	8	3	91.4
LOWER LAKE REGION .....	110	94	13	3	91.4
UPPER ST. LAWRENCE .....	105	87	11	7	88.1
LOWER ST. LAWRENCE .....	95	77	12	6	87.4
GULF .....	90	70	13	7	85.0
MARITIME PROVINCES .....	97	73	13	11	82.0
TOTAL .....	578	471	70	37	87.5

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer R. F. Stupart.

## TORONTO OBSERVATORY—MAGNETIC REVIEW FOR JULY, 1894.

On the 1st a slight disturbance was registered the movements increasing after 11 p.m., the declination showing a marked increase. By 8 a.m. of the 2nd it had quieted down, but during the afternoon hours it was again disturbed. During the afternoon of the 1st the h. f. gradually increased and previous to 6 p.m. a few rapid movements were registered. The horizontal force continued slightly disturbed to the afternoon of the 2nd. The v. f. showed but little change on the 1st, but between 3 and 5 p.m. of the 2nd a marked increase of force was registered. On the night of the 5th a small disturbance appeared but passed off by 2 a.m., of the 6th. On the 7th another slight disturbance was registered. The h. f. curve was unsteady and the declination on the morning of the 8th showed slow waves of disturbance, and again on the night of the 16th and morning of the 17th. On the 20th an important storm was registered the declination vibrating rapidly. The storm began after 4 a.m. and was at its height at 6 a.m. it increased again during the evening. The range of declination during this disturbance was  $1^{\circ}49'$  the easterly extreme taking place at 5.24 a.m. and the westerly at 6.34 a.m. This disturbance passed off by 10 p.m. of the 20th. Between 4 and 8 a.m. of the 20th both forces decreased rapidly especially the h. f. a rapid recovery following from 2 to 7 p.m. the h. f. was considerably increased, and some rapid changes were registered. A slight disturbance was registered on the 21st, 22nd and 23rd in fact to the end of the month, the most marked movement was a sharp westerly change of declination after 1 a.m. of the 24th accompanied by a decrease of both forces lasting for about an hour.

On the 1st auroral light (Class IV) this display continued visible during the early hours of the 2nd, waves and streamers rising above a dark bank of cloud in N. On the 4th (Class IV) at 10 p.m. On the 28th (Class IV) at 10 p.m. On the 2nd, 3rd, 5th, 6th, 8th, 9th, 10th, 14th, 17th, 18th, 19th, 21st, 22nd, 25th, 26th, 27th, 29th, 30th, and 31st, the sky was clear but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,

*Acting Director.*

METEOROLOGICAL OFFICE,

Toronto, 15th November, 1894.



RESULTS OF OBSERVATIONS at Moose Factory, H. B., April, 1893, to July, 1894, inclusive. Lat. 51° 16' N., Long. 80° 56' W., Height above sea 30.5 ft.

	April, 1893.	May.	June.	July.	August.	September.	October.	November.	December.	Jan'y, 1894.	February.	March.	April.	May.	June.	July.
Pressure—Mean reduced to Sea Level.....	30.019	29.870	29.849	29.781	29.874	29.879	29.873	29.816	30.061	30.046	30.071	29.950	30.103	29.903	29.848	29.827
Highest.....	30.066	30.281	30.179	30.193	30.270	30.417	30.603	30.500	30.025	30.333	30.798	30.698	30.925	30.510	30.226	30.157
Lowest.....	29.311	29.388	29.204	29.423	29.411	29.376	29.048	29.211	29.282	29.001	29.267	28.954	29.372	29.070	29.342	29.538
Range.....	1.255	0.893	0.975	0.770	0.739	1.041	1.555	1.290	1.343	1.129	1.531	1.654	1.533	1.440	0.884	0.619
TEMPERATURE—Mean of 9 a.m., 2 and 7 p.m., local time.....	22.25	43.49	64.62	62.68	63.66	50.77	43.48	22.15	-0.91	-6.80	-5.38	14.25	31.44	41.46	61.6	63.1
Highest.....	55.2	81.0	92.1	93.1	99.1	79.0	70.1	54.2	39.0	38.0	37.0	48.1	63.1	66.1	94.1	88.1
Lowest.....	-17.0	23.0	31.9	39.9	37.9	39.0	13.0	-12.0	-37.5	-40.4	-39.0	-25.0	39.0	25.0	31.9	37.9
Mean Highest.....	32.98	51.19	73.73	72.09	72.69	58.82	51.64	31.27	2.10	5.72	11.99	24.32	38.59	47.59	70.68	72.77
Mean Lowest.....	6.00	32.29	50.39	51.55	51.55	39.29	34.70	15.33	-21.08	-18.04	-18.46	0.05	13.94	32.63	46.94	51.59
Mean Daily Average.....	28.98	18.90	23.34	21.37	21.24	19.53	17.84	14.94	23.78	23.76	30.37	24.27	24.65	14.88	24.64	20.19
Cloud—Percentage of sky clouded.....	50	54	55	64	56	57	79	62	45	41	31	67	53	70	45	49
No. of Clear Days.....	10	11	6	3	6	5	1	7	10	16	13	4	7	4	7	6
WIND—Estimated Force.....	3.7	3.8	3.6	3.5	3.4	3.4	3.6	3.3	2.7	2.6	3.3	1.9	3.3	4.0	3.7	3.8
N.....	15	25	22	15	19	11	4	14	12	13	12	18	14	43	11	12
N.E.....	30	15	21	7	7	7	1	0	6	5	8	19	30	15	24	21
E.....	12	3	13	4	3	2	4	1	1	3	1	1	5	5	5	4
S.E.....	0	4	2	1	1	1	9	6	2	2	0	2	2	3	2	1
S.....	6	4	8	12	23	15	21	10	21	15	20	3	2	2	10	10
S.W.....	19	11	18	14	25	26	38	24	22	17	22	11	8	6	13	23
W.....	3	6	3	11	3	8	9	22	18	15	6	11	8	6	12	13
N.W.....	11	7	4	7	6	11	13	9	1	8	7	16	9	9	5	5
C.....	1	3	5	7	5	5	4	4	4	12	7	12	10	4	6	4
Rain—Amount.....	R.	0.151	0.458	0.445	0.188	0.239	0.550	0.283	0.00	R.	0.00	R.	R.	0.739	0.179	0.154
No. of Days.....	3	10	14	21	9	1	14	2	0	1	0	3	4	11	6	10
Snow—Amount.....	4.5	3.0	..	..	..	..	5.5	14.5	12.5	9.5	6.5	8.0	5.5	..	..	..
No. of Days.....	10	2	0	0	0	0	8	12	10	6	7	13	3	5	2	0
Thunder—Recorded on Days.....	0	0	0	0	0	0	0	0	0	0	0	1	0	1	7	6
Aurora—No. of.....	2	1	0	0	6	6	2	3	7	6	6	2	7	2	0	2
Fog—No. of.....	1	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0



## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

AUGUST, 1894.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### ATMOSPHERIC PRESSURE.

Pressure was a little above its average over nearly the whole continent and as much as  $+0.50$  inches from Lake Superior to Alberta, as well as along the Californian Coast, and over the greater portion of the Rocky Mountain region south to Texas.

The month was chiefly noticeable for the absence of any West India hurricanes, quite a contrast to August, 1893, when no less than four of these storms travelled either up the Atlantic or a little inland, and made their presence felt by the severe gales and heavy rains which accompanied them.

August of this year was entirely free from any gales, and the winds seldom increased to strong breezes. The depressions were unimportant and shallow, and as proved by the general mean pressure the high predominated over the low pressure. The showers and thunder-storms accompanying the depressions were, with few exceptions, neither heavy nor widespread in Ontario and Quebec, and the rainfall in these provinces was much below its average. In the North-west Territories and the Maritime Provinces the rainfall was also not up to its normal.

Between the 1st and 3rd a shallow depression passed over the lakes and down the St. Lawrence and gave moderate showers and thunder-storms pretty generally. The next depression to bring any widespread showers, and it was a very shallow one, travelled into the lake region from the Western States on the 14th, and was chiefly noticeable for its accompanying heavy showers in the St. Lawrence Valley. During the evening and night of the 20th a heavy rainfall occurred over the Maritime Provinces during the passage of a depression which was increasing in energy, and this area taken in conjunction with the advance of high pressure from the Northwestward, drew strong west and northwest winds on the 21st over the Lower St. Lawrence Valley and the Gulf.

### TEMPERATURE.

The temperature in British Columbia, North-west Territories and Manitoba was above the normal; in the Eastern Provinces it was about normal, or slightly below.

*The Highest and Lowest Temperatures in each Province during August were :*

British Columbia,  $100^{\circ}\text{O}$  on 2nd at Spence's Bridge;  $25^{\circ}\cdot 2$  on 28th at Spence's Bridge.

North-west Territories,  $107^{\circ}\text{O}$  on 25th at Chaplin;  $33^{\circ}\cdot 5$  on 14th at Prince Albert.

Manitoba,  $104^{\circ}\text{O}$  on 21st at Fort Ellice;  $31^{\circ}\text{O}$  on 15th at Oak Bank.

Ontario,  $96^{\circ}\text{O}$  on 7th at Paris;  $26^{\circ}\text{O}$  on 15th at Savanne.

Quebec,  $83^{\circ}\text{O}$  on 27th at St. Hyacinthe;  $30^{\circ}\text{O}$  on 27th at Brome.

New Brunswick,  $88^{\circ}\text{O}$  on 7th at Bathurst;  $37^{\circ}\cdot 8$  on 22nd at Chatham.

Nova Scotia,  $87^{\circ}\text{O}$  on 7th at Pictou;  $38^{\circ}\cdot 5$  on 12th at Truro.

Prince Edward Island,  $84^{\circ}\cdot 3$  on 8th at Georgetown;  $48^{\circ}\text{O}$  on 22nd at Charlottetown.



[illegible]



## PRECIPITATION.

The rainfall throughout the Dominion during the month of August was very much below the normal quantity, in some counties of Ontario and in many districts of Manitoba the complaints were numerous with regard to destruction of pastures and fruit; the root crops also suffering severely, the thunder-storms in many cases being unaccompanied by any precipitation.

*The general distribution is as follows :—*

In British Columbia, the rainfall was in general 0·70 in., or about 0·44 in. below the average.

In the North-west Territories, 1·83 in., about 0·06 in. below the average.

In Manitoba, the rainfall was 1·03 in., or 1·86 in. below the average.

In Ontario, West and South-west District, it was 0·34 in., or 2·20 in. below the average. In the North and North-west District it was 1·48 in., or 0·66 in. below the average. In the Central District it was 0·52 in., or 1·52 in. below the average; and in the East and North-east District it was 1·02 in., or 1·08 in. below the average.

In Quebec it was 2·11 in., or 1·08 in. below the average.

In New Brunswick it was 2·45 in., or 1·17 in. below the average.

In Nova Scotia it was 2·60 in., or 1·04 in. below the average.

In Prince Edward Island it was 2·81 in., or 0·76 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

British Columbia,—Port Simpson, 9·08 in.; Rivers Inlet, 8·03 in.

Nova Scotia,—Port Hastings, 5·55 in.

*Rain one inch and upwards in 24 hours :—*

2. Thompson, 1·45 in.; Ennismore, 1·30 in.; Peterborough, 1·40 in.; Clontarf, 1·37 in.; White River, 1·00 in.

3. St. Hyacinthe, 1·05 in.

9. Pense, 1·19 in.; Glen Adelaide, 1·55 in.; Point Escuminac, 1·37 in.; Chatham, 1·71 in.

10. Hartney, 1·23 in.; Port Hastings, 2·10 in.

12. Ennismore, 1·00.

14. Presque'Isle, 1·25 in.; Haileybury, 1·25 in.

15. Point des Monts, 1·30 in.; Cape Chatte, 1·43 in.; Anticosti, W.P., 1·25 in.; Father Point, 1·41 in.

16. Port Simpson, 1·39 in.; Anticosti, S.W., 1·71 in.

17. Thompson, 1·08 in.; Port Simpson, 1·35 in.; Sidney, 1·67 in.

18. Port Simpson, 2·18.

19. Rivers Inlet, 1·20 in.

20. Rivers Inlet, 1·25 in.; Port Simpson, 1·11 in.; Pictou, 1·35 in.

21. Rivers Inlet, 2·32 in.; Port Hastings, 1·21 in.; Charlottetown, 1·28 in.; Grindstone, 1·54 in.

22. Cape Norman, 1·01 in.

27. Banff, 1·48 in.

28. Pincher Creek.

30. St. Johns, 1·70 in.

*Thunder recorded on—*

1. Welland, Peterborough, Bognor, Georgina, Point Clark, Cowal, Wilton Grove, Wiarton, Lucknow, Owen Sound, London, Stratford, Port Stanley, Port Dover.

2. Beatrice, Clontarf, Welland, Whiteside, Peterborough, Trenton, Bognor, Banff, St. Mary's, Georgina, Point Clark, Stony Creek, Georgetown, Wyoming, Lucknow, Wilton Grove, Gravenhurst, Thedford, Bancroft, Mount Forest, Burk's Falls, Midland, Aurora, Denbigh, Alton, Uplands, Owen Sound, Barkerville, Chilcotin, Sprucedale, Lindsay, Ottawa, Stratford, Port Stanley, Port Dover, White River, Parry Sound, Mattawa.

3. Chicoutimi, Quebec, Port Dover.

4. Mellendean, Pembina Crossing, Chicoutimi, Barkerville.

5. Pincher Creek, Henrietta, Emerson, Banff, Chilcotin, Fort Steele, Edmonton.

6. Pincher Creek, Banff, Barkerville, Fort Steele, Kaslo.

7. Fort Ellice, St. Albans, Brandon, Treherne, Belmont, Rosebank, Selkirk, Portage la Prairie, Hillview, Emerson, Arden, Moose Jaw, Calgary, Midland, Chilcotin, Merriton.

8. Oak Bank, Pincher Creek, Brandon, Norquay, Pembina Crossing, Clontarf, Haliburton, Bognor, Moose Jaw, Calgary, Point Escuminac, Point Clark, Bancroft, Lion's Head, Burk's Falls, Presque'Isle, Denbigh, Alton, Owen Sound, Sprucedale, Deseronto, Medicine Hat, Edmonton.

9. Turtle Mountain, Belmont, Hillview, Welland, Moose Jaw, St. Mary's, Paris, Elora, Stony Creek, Georgetown, Sunshine, Lucknow, Elkhorn, London, Stratford, Kingston, Bermuda, Qu'Appelle, Swift Current.

10. Mellendean, Pembina Crossing, Hillview, Emerson, Oonikup, Scarborough, Bermuda.

11. Bermuda.

12. Oak Bank, Pincher Creek, Clontarf, Moose Jaw, Saskatoon, Cowal, Chilcotin, Kaslo, Lindsay.

13. Treherne, Belmont, Rosebank, Georgina, Barkerville, Ottawa, Mattawa.

14. Beatrice, Norquay, Haliburton, Bognor, Moose Jaw, Point Clark, Scarborough, Bancroft, Burk's Falls, Midland, Presque'Isle, Alton, Uplands, Lucknow, Sprucedale, Coldwater.

15. Fort Ellice, Norquay, Treherne, Belmont, Rathwell, Hillview, Welland, Sunshine, Lindsay, Elkhorn, Mattawa.

16. Mellendean, Pembina Crossing, Treherne, Belmont, Rathwell, Brandon, Hillview, Emerson, Arden, Truro, Grand Manan.

17. Pembina Crossing, Brandon, Bognor, Lion's Head, Midland, Presque'Isle, Warton, Merritton, Coldwater, Port Arthur, Parry Sound, Haileybury.

18. Beatrice, Rathwell, Portage la Prairie, Cottam, Owen Sound, Deseronto, Bermuda, Port Arthur, Prince Albert.

19. Pembina Crossing, White River.

20. Port Rowan, Merritton, St. Andrews.

21. Oak Bank, Mellendean, Pembina Crossing, Rathwell, Portage la Prairie, Emerson, Swift Current, French Creek.

22. Rosebank.

23. Alberni, Kuper Island, Salt Spring Island, Rivers Inlet, Agassiz, Hazlemere.

24. Sproat Lake.

25. Rosebank, Peterborough, Scarborough, Richmond, Channell, St. John, Lindsay, Truro.

26. Virgil, Sable Island, Channell, St. John, Halifax, Grand Manan, St. Andrews, Edmonton.

27. Brandon, Bancroft, Burk's Falls, Uplands, Fort Steele, Elkhorn, Ottawa.

28. Shannonville, Qu'Appelle.

29. Welland, Whiteside, Peterborough, Trenton, Bognor, Point Clark, Gravenhurst, Lindsay, Scarborough, Mount Forest, Lion's Head, Presque'Isle, Alton, Uplands, Owen Sound, Deseronto, Stratford, Grindstone.

30. Bognor, Bathurst, Mattawa.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (II'), the feeblest in brilliancy.*

1. Georgetown, P.E.I.; Pembina Crossing.

2. Savanne, St. Albans, III; Elkhorn, II; Minnedosa, IV.

3. Savanne, St. Albans, IV; Elkhorn, II.

4. Burk's Falls, IV; Bancroft, III; Gravenhurst, III; Elora, Savanne, Moose Jaw, Fort Ellice, III; Coldwater, II; Port Arthur, II.

5. Moose Jaw, Truro, IV; Kingston, III; Haileybury, IV.

6. Savanne, Hillview, III; Alameda, III; Pembina Crossing, II; St. Albans, II; Channel Island, Elkhorn, I; Minnedosa, II.

9. Pembina Crossing, IV; Haileybury, III.

10. Chicoutimi, IV; Hillview, IV; St. Albans, IV; Quebec, IV; Minnedosa, II.

11. Hillview, III; Alameda, IV; Truro, IV; Quebec, III.

14. Savanne, Calgary, Hillview, IV; St. Albans, IV; Fort Ellice, III; Medicine Hat, III; Prince Albert, I.

18. Chaplin, II; Pembina Crossing, III.

19. Loch Erroch, Lucknow, Burk's Falls, IV; Mount Forest, Gravenhurst, I; Elora, Point Clark, II; Beaver Bank, V. I., about 10 p.m. a grand aurora like a tent with its centre over the



valley, the rose colouring was beautiful ; Chicoutimi, III ; Georgetown, Savanne, Saskatoon, Moose Jaw, Hillview, I ; New Westminster, Kuper Island, I ; Peterborough, II ; Clontarf, IV ; Emerson, Alameda, III ; Pembina Crossing, I ; Channel Island, IV ; Ottawa, III ; Port Stanley, Quebec, Father Point, III ; Beatrice, Brandon, *red* ; St. Albans, I ; Oak Bank, Fort Ellice, II, *coloured* ; Sprucedale, II ; Medicine Hat, IV ; Minnedosa, III ; Qu'Appelle, II.

20. Sproat Lake, Elora, Georgina, Savanne, Saskatoon, Hillview, III ; Pembina Crossing, III ; Port Arthur, II ; White River, III.

21. Pembina Crossing, II ; Quebec, IV.

23. Savanne, Truro, IV.

24. Chicoutimi, IV ; Savanne, Father Point, III.

25. Chicoutimi, Channel Island, IV.

26. Bancroft, III ; Point Escuminac.

27. Haileybury, IV.

28. Channel Island, IV ; Minnedosa, II.

29. Savanne, Hillview, Father Point, IV.

30. Savanne.

31. Quebec, IV ; Father Point, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF AUGUST, 1894.

	HOURS ENDING															
	5	6	7	8	9	10	11	NOON.	1	2	3	4	5	6	7	8
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.		P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
ESQUIMALT .....	..	0.06	0.34	0.69	0.77	0.75	0.75	0.77	0.81	0.76	0.73	0.66	0.66	0.56	0.07	..
AGASSIZ .....	..	.23	.54	.69	.75	.75	.79	.77	.79	.80	.71	.62	.38	.07	..	..
INDIAN HEAD.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BRANDON.....	..	.04	.32	.43	.71	.81	.80	.82	.82	.81	.86	.83	.66	.54	.16	..
WINNIPEG.....	..	.24	.55	.70	.77	.82	.79	.82	.86	.86	.82	.59	.49	.37	.10	..
WOODSTOCK.....	..	.02	.31	.54	.59	.73	.71	.65	.67	.62	.64	.54	.45	.18	.03	..
TORONTO.....	..	.09	.45	.54	.60	.61	.72	.72	.71	.70	.72	.64	.48	.25	.06	..
LINDSAY.....	..	.07	.13	.34	.50	.61	.58	.60	.64	.59	.61	.51	.31	.23	.18	.04
BARRIE.....	..	.09	.29	.46	.52	.56	.69	.69	.72	.71	.67	.65	.58	.37	.04	..
KINGSTON.....	..	.11	.34	.46	.56	.64	.67	.64	.60	.62	.56	.52	.46	.27	.08	..
MONTREAL.....	..	.08	.32	.44	.55	.58	.52	.64	.58	.51	.55	.46	.34	.16	..	..
FREDERICTON.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
MEAN PROPORTION FOR MONTH.....	0.58	0.55	..	..	0.60	0.61	0.47	0.52	0.42	0.50	0.46	0.47	..	..	..	..
(Constant sunshine being 1.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
MAXIMUM DAILY AMOUNT.....	0.85	0.87	..	..	0.85	0.89	0.86	0.85	0.99	0.39	0.90	0.90	..	..	..	..
DATE .....	17	9	..	..	20	20	22	5.25	16	16	20	26	..	..	..	..
NO. OF DAYS COMPLETELY CLOUDED.....	3	4	..	..	0	0	4	2	1	4	4	1	..	..	..	..

# PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 589. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	88	69	8	11	83·0
LOWER LAKE REGION.....	105	82	10	13	82·9
UPPER ST. LAWRENCE.....	101	84	11	6	88·6
LOWER ST. LAWRENCE.....	95	78	12	5	88·4
GULF.....	98	80	8	10	85·7
MARITIME PROVINCES.....	102	99	8	4	92·2
TOTAL.....	589	483	57	49	86·8

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer B. C. Webber.

## TORONTO OBSERVATORY—MAGNETIC REVIEW FOR AUGUST, 1894.

Mean declination for month..... 4° 42' 8" W.

Increase from August, 1893..... + 5' 6"

Absolute horizontal force..... 0·166217 C.G.S.

Decrease from August, 1893..... 0·000010 "

Absolute vertical force..... 0·602830 "

Decrease from August, 1893..... 0·000578 "

On the night of the 1st a slight disturbance was registered, and then from the 2nd until 6 p.m. of the 4th a quiet period prevailed. Slight disturbances were recorded on the nights of the 4th, 5th and 6th. The 7th was a comparatively quiet day, but after 10 p.m. of the 8th a slight disturbance appeared, which had, however, passed off again by noon of the 9th. From the 10th until the 16th the magnets were generally slightly disturbed. During the early morning hours and again in the evening of the 15th the disturbance was pretty well marked, and a reading of 27' to the eastward of normal was recorded at 7.37 p.m. From the 16th until the evening of the 19th these magnets were quiet, but at 6 p.m. of that day a slight disturbance began, and at 9 p.m. a sharp easterly deflection of the declination needle occurred, and from that hour until 8 a.m. of the 20th an important storm was registered, which was at its height between 3 and 6 a.m., during which time the needle was generally west of its normal bearing. The extreme westerly reading 1° 30' from normal occurred at 11.30 p.m., and the extreme easterly reading about 1° 57' from normal at 3.53 a.m. of the 20th, giving a total range of about 3° 27'. The vibrations between 2 and 6 a.m. of the 20th were very rapid, but after the latter hour the magnet gradually returned to its normal position. An increase of westerly declination and a general decrease of both vertical and horizontal components were the characteristic features of this storm. The horizontal force diminished rapidly after 9.40 p.m. of the 19th, and several times the spot of light went off the paper, denoting a change of over 1000 C.G.S. A rapid recovery of both components set in after 6 a.m. and after several rapid oscillations the needles came to rest at 8 a.m. on the 20th. On the afternoon of the 20th some rapid vibrations of small amplitude of the declination magnet were recorded, and up to the end of the month slight disturbances occurred, but it is noticeable that the afternoons were generally quiet.

On the 19th at 8.30 p.m. auroral light was observed in the north, and at midnight there was a bright auroral light in north and northeast (Class III to IV). On the 2nd, 3rd, 4th, 5th, 13th, 15th, 16th, 20th, 30th and 31st the sky was clear, but no aurora was observed on all other nights. Clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,

*Acting Director.*

MET. OBSERVATORY OFFICE,  
Toronto, 30th November, 1894.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

SEPTEMBER, 1894.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### ATMOSPHERIC PRESSURE.

The mean pressure of the month was from 0.06 to 0.08 above normal in the Maritime Provinces and from 0.05 to 0.10 below in Manitoba and the North-west Territories.

The month opened with low pressure over the North-west States and Territories and high pressure southward from the Lakes and St. Lawrence Valley and eastward from the Mississippi to the Atlantic.

During the night of the 1st a rapid cyclonic movement southward across the Gulf of St. Lawrence there gave rain and a gale of wind, and on the 2nd as the cyclone passed off there was an anti-cyclonic development north of the Upper St. Lawrence Valley which caused cool northeasterly winds in eastern Ontario, while hot southwesterly winds prevailed in the western and southern portions, and during the afternoon a phenomenally heavy thunder storm occurred in Toronto and vicinity, and thunder storms were pretty general in a narrow strip of country between Lake Ontario and the Georgian Bay. During the 3rd and 4th the anti-cyclone which was well pronounced moved southeastward across New England and then seaward. In the North-west Territories the pressure continued low with west and southwest gradients predominating.

A small depression which between the mornings of the 4th and 5th passed from the Upper Lakes to the Gulf of St. Lawrence, at night gave rain both in Ontario and Quebec.

On the 6th the centre of the western cyclonic area appeared further south than on the previous days, being between Wyoming and Kansas, while high pressure prevailed over the Lake Region, and in the Canadian North-west the pressure had increased and a northeasterly gradient prevailed. On the 7th there was a decided movement of the storm centre towards the northeast, while the centre of the anti-cyclone passed to New Brunswick; heavy rain fell most of the day in Manitoba, and at night there was a very heavy rain over the greater part of Ontario. During the 8th the storm centre moved from Lake Superior to the Gulf of St. Lawrence, giving a showery day in Quebec and showers in parts of the Maritime Provinces at night.

A very decided cyclonic development occurred in the North-west during the night of the 8th and the morning chart of the 9th showed the storm centre in Northern Manitoba, and to the westward there was rapidly increasing pressure. The movement of this storm centre was very rapid and its track was from Lake Superior to the Gulf of St. Lawrence and was closely followed by the anti-cyclone, which moved southeast to the Missouri Valley and then eastward across the Lake Region. This storm caused rain, followed by a westerly gale throughout its course.

An important area of depression appeared over northern British Columbia on the 10th and moved southeastward across the Territories with increasing energy; its maximum intensity was reached early on the 13th, when centred near Qu'Appelle, after which it gradually filled up and moved very slowly eastward, with the centre far to the northward. This storm on the 12th and

13th caused a cold northwesterly gale, with rain, over the western portion of our Territories, while in Manitoba the weather was fair and hot, with southerly winds; after this the weather became cooler in Manitoba and was generally fair throughout the Territories.

The anti-cyclone, which had followed the preceding storm, had meanwhile moved very slowly over the Lake Region and New England, increasing in energy. During the night of the 12th, while the centre of the high pressure was over New York State, a small and very shallow depression subsidiary to that in the North-west moved up the Mississippi Valley and over Lake Michigan, accompanied by a rain area, which on the 13th embraced the whole of the Lake Region; then again on the 15th a small depression passed from the Upper Lakes eastward, giving local rain that evening in Ontario and next day in the St. Lawrence Valley; but from the 14th until the 19th the weather in Canada was generally fine and warm, and from Ontario eastward the pressure was a little above average.

Between the 17th and 20th two depressions entered the North-west Territories from British Columbia, but the weather remained fairly settled and dry. On the 19th a shallow depression approached the Lower Lakes from the south, and on the 20th passed down the St. Lawrence Valley; rain fell during the night of the 19th and early on the 20th in Southern and Eastern Ontario, and the 20th was a rainy day in Quebec.

The 8 p.m. chart of the 21st showed low pressure generally over the North-west Territories, and that of the 22nd morning showed an energetic cyclonic development between Lake Superior and Dakota, while high pressure was spreading in rapidly over the extreme North-west; rain fell during the night in Ontario, and by next morning the centre of a severe storm was centred north of Lake Huron, whence it moved east, while an important anti-cyclone closed in rapidly behind it, and a fresh to strong westerly gale prevailed on the Lakes. At the same time there was a fresh southerly gale in the northern part of the Gulf of St. Lawrence, but the Maritime Provinces were but little affected by the storm. The anti-cyclone was of great importance, and in Manitoba and the North-west Territories it brought the first really severe frosts of the season in the early morning of the 24th and on the following morning also in the more northern parts of Ontario. From the Lakes eastward the movement of this area was very slow, and the weather until the last day of the month was very fine and warm in Ontario, Quebec and the Maritime Provinces; this while a most severe West India hurricane was slowly dispersing near the Middle Atlantic Coast.

A rapid diminution of pressure set in over the North-west Territories on the 25th, but with the exception of a small rain in Edmonton the weather continued fine and dry until the 28th. On the 28th there was a heavy rain in Manitoba as a storm centre passed northeastward from the Missouri Valley to Lake Superior, and afterwards as it passed across the Lakes there were local rains, followed at most points by a moderate westerly gale.

#### TEMPERATURE.

The temperature from Manitoba westward has been below the normal; eastward it has been above, except at the stations in the Gulf of St. Lawrence.

*The Highest and Lowest Temperatures in each Province during September were:*

British Columbia, 90°·0 on the 10th at Spence's Bridge; 22°·0 on 21st at Princeton.  
North-west Territories, 91°·0 on the 12th at Moose Jaw; 17°·0 on 28th at Glen Adelaide.  
Manitoba, 98°·5 on the 2nd at Emerson; 12°·0 on 30th at Fort Ellice.  
Ontario, 96°·0 on the 2nd at Paris and Stony Creek; 21°·2 on 26th at Bancroft.  
Quebec, 81°·0 on the 23rd at Father Point; 25°·0 on 26th at Brome.  
New Brunswick, 79°·0 on the 23rd at Bathurst; 29°·5 on 27th at Fredericton.  
Nova Scotia, 80°·3 on the 17th at Truro; 23°·7 on 8th at Truro.  
Prince Edward Island, 76°·2 on the 19th at Georgetown; 35°·0 on 27th at Georgetown.





6

## PRECIPITATION.

The rainfall for September has, with the exception of parts of Ontario and British Columbia, been below the normal, the greatest defect occurring in Nova Scotia.

*The general distribution is as follows :—*

In British Columbia the rainfall was in general 4·39 in., or about 2·90 in. above the average.

In the North-west Territories, 1·16 in., about 0·36 in. above the average.

In Manitoba the rainfall was 2·03 in., or 0·13 in. below the average.

In Ontario, West and South-west District, it was 3·94 in. or 1·12 in. above the average. In the North and North-west District, it was 3·62 in. or 0·07 in. below the average. In the Central District, it was 4·71 in., or 2·05 in. above the average, and in the East and North-east District it was 2·64 in., or 0·29 in. below the average.

In Quebec it was 3·01 in., or 0·21 in. below the average.

In New Brunswick it was 2·75 in., or 0·18 in. below the average.

In Nova Scotia it was 2·08 in., or 1·27 in. below the average.

In Prince Edward Island it was 2·79 in., or 0·21 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Canobie, 5·15 in. ; Rivers Inlet, 16·44 in. ; Alberni, 7·24 in. ; Glacier, 6·48 in. ; Abbotsford, 5·13 in. ; Loch Erroch, 10·39 in. ; New Westminster, 9·23 in. ; Griffin Lake, 8·50 in. ; Hazlemere, 5·89 in. ; Pilot Bay, 5·46 in. ; Agassiz, 8·26 in. ; Beaver Creek, 6·52 in. ; Langley, 7·53 in. ; Union, 5·54 in. ; Goldstream, 6·12 in.

MANITOBA—Stony Mountain, 5·14 in.

ONTARIO.—St. Thomas, 6·23 in. ; Warton, 5·07 in. ; Huntsville, 5·61 in. ; Georgetown, 5·37 in. ; Elora, 5·60 in. ; Alton, 5·32 in. ; Toronto, 5·48 in. ; Thorold, 5·03 in. ; London, 5·47 in. ; Port Rowan, 5·12 in. ; Lucknow, 5·30 in. ; Schreiber, 7·50 in. ; Owen Sound, 6·14 in. ; Uplands, 6·01 in.

BERMUDA, 9·23 in.

*Rain one inch and upwards in 24 hours :—*

1. Rivers Inlet, 2·12 in.
2. Rivers Inlet, 1·47 in. ; Heron Bay, 1·10 in. ; Alton, 1·27 in.
3. Rivers Inlet, 1·79 in. ; White River, 1·10 in. ; Schreiber, 1·25 in.
4. Rivers Inlet, 1·75 in. ; Bognor, 1·00 in. ; Pilot Bay, 1·00 in. ; Battle Harbour, 1·32 in.
5. Agassiz, 1·10 in. ; St. Thomas, 1·87 in.
6. Oak Bank, 1·03 in. ; Durham, 1·00 in.
7. Pilot Mound, 1·53 in. ; Cowall, 2·15 in. ; Waterford, 1·08 in. ; Chatham, 1·04 in. ; Birnam, 1·07 in.
8. London, 1·07 in. ; Woodstock, 1·10 in. ; Wyoming, 1·50 in. ; Mount Forest, 1·10 in. ; Lyons, 1·11 in. ; Coldstream, 1·28 in. ; St. Thomas, 1·53 in. ; Port Stanley, 1·36 in. ; Point Clark, 2·37 in. ; Port Rowan, 1·09 in. ; Lucknow, 2·41 in. ; Elora, 1·16 in. ; Birnam, 1·08 in. ; Alton, 1·06 in.
9. Sarnia, 3·22 in. ; Lyons, 1·20 in.
10. London, 1·02 in. ; Point Escuminac, 1·30 in. ; Port Rowan, 1·13 in. ; Uplands, 1·16 in. ; Mattawa, 1·33 in. ; Chatham, 1·24 in.
11. Anticosti, 1·62 in.
12. Port Steele, 1·03 in.
13. Fort Steele, 1·03 in.
14. Georgetown, Ont., 1·12 in. ; Sunshine, 1·25 in. ; Lucknow, 1·23 in.
15. London, 1·29 in. ; Nottawasaga, 2·20 in. ; Conestogo, 1·10 in. ; Loch Erroch, 1·20 in. ; Orillia, 1·02 in. ; Virgil, 1·11 in. ; Burk's Falls, 1·10 in. ; Stratford, 1·05 in.
16. Rivers Inlet, 1·64 in. ; Thompson, 1·12 in.
17. St. John, 2·81 in. ; Rivers Inlet, 1·29 in. ; Agassiz, 1·04 in. ; St. Andrew, 1·02 in. ; New Westminster, 2·31 in. ; Hazlemere, 1·10 in.
18. Langley, 1·84 in. ; Yarmouth, 2·27 in. ; Digby, 1·00 in.
19. Scarborough, 1·00 in. ; St. George, 1·59 in.
20. Fredericton, 1·00 in. ; Esquimalt, 1·12 in. ; Agassiz, 1·08 in. ; Goldstream, 1·20 in. ; Georgetown, Ont., 1·02 in. ; Grand Manan, 1·62 in. ; Welland, 1·27 in. ; Abbotsford, 1·35 in. ; Loch Erroch, 2·10 in. ; New Westminster, 2·03 in. ; Hazlemere, 1·09 in. ; St. Hyacinthe, 1·21 in. ; Paris, 1·10 in. ; Thorold, 2·28 in. ; Virgil, 1·33 in. ; Brantford, 1·50 in. ; Stony Creek, 1·10 in. ; Bathurst, 1·50 in.



21. Langley, 1'48 in. ; Huntsville, 1'26 in. ; Grindstone, 1'39 in. ; Charlottetown, 1'23 in. ; Port Hastings, 1'10 in. ; Digby, 1'10 in. ; Whitehead, 1'61 in. ; Channell, 1'87 in.
22. London, 1'10 in. ; Huntsville, 2'00 in. ; Wiarton, 1'50 in. ; St. Thomas, 1'05 in. ; Alameda, 1'75 in. ; Heron Bay, 1.20 in.
23. Nottawasaga, 1'00 in. ; Wilton Grove, 1'20 in. ; Presque Isle, 1'00 in. ; Rockliffe, 1'16 in. ; Sprucedale, 1'91 in. ; Parry Sound, 1'00 in. ; Whiteside, 1'58 in. ; Uplands, 1'90 in. ; Mattawa, 1'00 in. ; Haileybury, 1'60 in.
24. Glacier, 1'05 in.
25. Alberní, 1'23 in. ; Goldstream, 1'00 in. ; Union, 1'22 in.
26. Rivers Inlet, 1'02 in. ; Alberní, 2'09 in. ; Canobie, 1'21 in. ; Union, 1'25 in. ; Bermuda, 2'56 in.
27. Alberní, 1'45 in.
28. Pilot Mound, 1'25 in. ; Rathwell, 1'37 in. ; Treherne, 1'26 in. ; Selkirk, 1'42 in. ; Bermuda, 3'49 in. Rosebank, 1'25 in.

*Thunder recorded on—*

1. Qu'Appelle, Swift Current, Presque'Isle, Portage la Prairie, Hillview, Alameda.
2. Minnedosa, Bermuda, Parry Sound, Point Clark, Savanne, Lion's Head, Midland, Wiarton, Scarborough, Georgetown, Welland, Owen Sound, Brantford, Birnam, Georgina, Elora, Kaslo, Bognor, Haileybury, Moose Jaw, Stony Creek, Gravenhurst, Shannonville, Durham, Galt, Toronto.
3. Qu'Appelle, London, Aurora, Scarborough, Oak Bank, Whiteside, Birnam, Gravenhurst, Galt, Coldwater, Emerson.
4. Lindsay, Port Dover, Haliburton, Midland, Scarborough, Georgetown, Thedford, Owen Sound, Brantford, Georgina, Chicoutimi, Bognor, Lucknow, Alton, Deseronto, Galt, Stratford, Toronto.
5. London, Lindsay, Port Dover, Mount Forest, Dealtown, Thompson, Oakbank, Portage la Prairie, Port Dover, Pelee Island, Alton, Peterborough, Deseronto, Rosebank, Coldwater, Emerson, Toronto.
6. Halifax, Grand Manan, Savanne, Wyoming, Oak Bank, Portage la Prairie, St. Albans, Emerson.
7. Minnedosa, London, Port Dover, Port Stanley, Point Clark, St. Thomas, Waterford, Midland, Cowal, Thedford, Oak Bank, Port Rowan, Cottam, Bognor, Lucknow.
8. Edmonton, Lindsay, Montreal, Port Dover, Port Stanley, Presque'Isle, St. Thomas, Princeton, Mount Forest, Deer Park, Scarborough, Georgetown, Thedford, Welland, Port Rowan, Owen Sound, Birnam, St. Mary's, Sprucedale, Alton, Stony Creek, Gravenhurst, Peterborough, Durham, Coldwater, Stratford, Toronto.
9. London, Port Dover, Point Clark, Lion's Head, Cottam, Trenton, Birnam.
10. Lindsay, St. John, Kingston, Port Dover, Presque'Isle, St. Thomas, Aurora, Waterford, Mount Forest, Scarborough, Wilton Grove, Dealtown, Georgetown, Welland, Port Rowan, Uplands, Owen Sound, Brantford, Birnam, St. Mary's, Gravenhurst, Shannonville, Durham, Deseronto, Galt, Paris, Elora, Bognor, Bancroft, Lucknow, Mattawa, Alton, Stony Creek, Coldwater, Toronto.
11. Union, Calgary, Pelee Island, Bognor.
12. French Creek, Hillview, Bognor.
13. Minnedosa, Lindsay, Alberní, Presque'Isle, Princeton, Scarborough, Georgetown, Portage la Prairie, Welland, Trenton, Birnam, Elora, Bognor, Bancroft, Toronto, Lucknow, Alton, Galt.
14. Lion's Head, Deer Park, Paris, Bognor, Lucknow, Peterborough, Deseronto, Galt, Emerson.
15. Lindsay, Bermuda, Kingston, Parry Sound, Spence, Haliburton, Point Clark, Lion's Head, Presque'Isle, Aurora, Mount Forest, Wiarton, Midland, Scarborough, Georgetown, Cowal, Welland, Whiteside, Port Rowan, Uplands, Brantford, Toronto, Birnam, Elora, Beatrice, Clontarf, Bognor, Bancroft, Sprucedale, Lucknow, Alton, Stony Creek, Gravenhurst, Burk's Falls, Durham, Ottawa, Deseronto, Galt, Coldwater, Stratford, Toronto.
16. Aurora, Thompson, Deseronto.
19. Denbigh, Fort Steele.
20. Montreal, Point Clark, Richmond, Brome.
21. Haliburton, Point Clark, St. Thomas, Midland, Pelee Island, Beatrice, Bognor, Lucknow, Haileybury, Gravenhurst.

22. London, Spence, Mount Forest, Wiarton, Midland, Georgetown, Cowal, Thompson, White-side, Port Rowan, Uplands, St. Mary's, Beatrice, Clontarf, Bognor, Lucknow, Alton, Durham, Stratford, Toronto.
23. Father Point, Parry Sound, Spence, Presque'Isle, Wilton Grove, Uplands, Bognor, Bancroft, Sprucedale, Gravenhurst, Galt, Coldwater.
24. Georgina, Deseronto, Galt.
25. Qu'Appelle, Point Clark.
26. Lion's Head, Presque'Isle, Uplands, Owen Sound, Birnam, Loch Erroch, Lucknow, Gravenhurst, Durham.
27. Savanne, Princeton, Virgil, Bognor, Durham.
28. Bermuda.
30. Lindsay, Haliburton, Scarborough, Uplands, Georgina, Toronto.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

2. Father Point, III ; Truro, IV ; Battle Harbour.
3. Minnedosa, I ; Portage la Prairie.
4. Hillview, IV ; Oak Bank, Portage la Prairie, Hillview, IV ; Channel Island, IV.
5. White River, III.
6. Dalhousie, Chicoutimi, IV ; Cape Chatte, Truro, IV.
7. Alameda, Truro, IV ; Battle Harbour.
8. Savange, Cape Norman, II ; Battle Harbour.
9. Battle Harbour.
10. Prince Albert, I ; Minnedosa, I ; Pembina Crossing, IV ; Hillview, IV ; Savanne, Henrietta, I ; Medicine Hat, III ; St. Albans, III ; Georgetown, Hillview, IV ; Chicoutimi, IV ; Channel Island, IV.
11. Pembina Crossing, III ; Quebec, III ; Port Arthur, III ; Portage la Prairie, St. Albans, III ; Channel Island, III.
12. Minnedosa, II.
13. Hillview, III ; Cottam, St. Albans, IV ; Hillview, III.
14. Belmont, Pembina Crossing, I ; Hillview, I ; Georgetown, III ; Midland, Huntsville, III ; Point Escuminac, II ; Halifax, IV ; Port Stanley, II ; Parry Sound, II ; Saugeen, IV ; Haliburton, IV ; Point Clark, II ; St. Thomas, Thedford, IV ; Cottam, Oakbank, Clontarf, IV ; Lucknow, II ; Chatham, Gravenhurst, Elkhorn, III ; Toronto, II ; Welland, IV ; Henrietta, Brantford, IV ; Birnam, III ; Hillview, Elora, Alameda, III.
15. Minnedosa, I ; Hillview, IV ; Brandon, IV ; White River, III ; Hillview, IV ; Elora, Haileybury, III ; Channel Island, IV.
16. Savanne.
17. Hillview, IV ; Georgetown, Burk's Falls, III.
18. Medicine Hat, St. Albans, II ; Hillview, IV ; Banff, IV ; Haileybury, I ; Moose Jaw, IV ; Cape Norman, III ; Battle Harbour.
19. Belmont, Pembina Crossing, II ; Savanne, Oakbank, Portage la Prairie, Henrietta, III ; Fincher Creek, Chicoutimi, IV ; Banff, IV ; Fort Steele, III ; Alameda, III ; Haileybury, II ; Mattawa, Moose Jaw, IV ; Gravenhurst, IV ; Emerson, III ; Cape Norman, II ; Battle Harbour.
20. Huntsville, IV ; Savanne, Battle Harbour.
21. Hillview, IV ; Halifax, IV ; Kingston, II ; Hillview, IV ; Elkhorn, I.
22. Fredericton, IV ; Hillview, III ; Point Escuminac, Quebec, III ; Father Point, IV ; Hillview, III ; Fort Steele, IV ; Haileybury, III ; Elkhorn, II.
23. Channell, IV ; Battle Harbour.
24. Savanne, Haileybury, IV ; Moose Jaw, IV ; Truro, IV.
25. Pembina Crossing, IV ; Point Escuminac, Quebec, III ; Father Point, III ; Georgina, Channell, IV ; Bancroft, II ; Gravenhurst, IV ; Truro, IV ; Coldwater, IV ; Cape Norman, II.
26. Minnedosa, II ; Pembina Crossing, III ; Savanne, Quebec, III ; Richmond, I ; Haileybury, III ; Moose Jaw, IV ; Truro, IV ; Stratford, IV ; Cape Norman, II.

27. Belmont, Pembina Crossing, 11; Georgetown, Scarborough, Huntsville, IV; Point Escuminac, Haliburton, III; Quebec, III; Haliburton, III; St. Thomas, Oakbank, Welland, II; Georgetown, Georgina, Richmond, I; Fort Ellice, III; Gravenhurst, IV; Durham, IV; Ottawa, IV; Coldwater, IV; Stratford, IV; Fort Steele, IV; Clontarf, IV; Bancroft, II; Lucknow, IV; Mattawa, Moose Jaw, IV; Emerson, Toronto, IV; Cape Norman, II.

28. Denbigh, Virgil, III; Sprucedale, I; Haileybury, IV; Moose Jaw, IV; Truro, IV.

29. Medicine Hat, III; Fort Steele, II; Moose Jaw, IV.

30. Minnedosa, III; Pembina Crossing, IV; Father Point, IV; Channell, IV; Truro, IV; Emerson, IV.

*Frost recorded on the following dates, when not mentioned the record of 32° or under is taken :—*

BRITISH COLUMBIA.—Langley 23rd, Enderby 22nd, Princeton 11th, Donald 14th, Fort Steele 19th, Hazelmere 24th, Quamichan 21st, Griffin Lake 23rd, Mission Valley, 23rd, New Westminster 22nd, Glacier 19th, 24th, 7 in. of snow, Salmon Arm 18th, Barkerville 15th, Chilcotin 23rd, Goldstream 13th.

NORTH-WEST TERRITORIES AND MANITOBA.—Edmonton 14th, Duck Lake 9th, Henrietta 10th, Belmont 15th, Cartwright 10th, Pilot Mound 15th, severe, Rathwell 17th, heavy, Treherne 17th, heavy, Oakbank 5th, Calgary (2) 3rd, St. Albans 16th, Hillview 16th, Glen Adelaide 16th, Gretna 17th, Pembina Crossing 17th, sharp, Hillview 16th, Selkirk 17th, Fort Ellice 17th, severe, Banff 10th, Alameda 8th, Oonikup 17th, Moose Jaw 10th, Brandon 10th, 17th, ice  $\frac{1}{2}$  in., Emerson 17th, Portage la Prairie 17th, Channel Island 20th, Rosebank 14th.

ONTARIO.—Lindsay 26th, Port Stanley 26th, Collingwood 26th, Galt 26th, ice, Stratford 26th, Paris 26th, St. Mary's 25th, Orillia 24th, Renfrew 26th, Welland 26th, Alton 25th, Norwood 26th, Conestogo 26th, Bancroft 12th, Brantford 25th, Peterborough 12th, Clontarf 26th, ice  $\frac{1}{4}$  in., Port Rowan 25th, Whiteside 26th, Birnam 26th, Georgina 25th, Beatrice 26th, Bognor 25th, Sprucedale 12th, Lucknow 26th, Gravenhurst 12th, Spence 12th, Haliburton 12th, Savanne 11th, Mattawa 12th, Missanabie 25th, Haileybury 26th, Uplands 12th, Owen Sound 12th, Heron Bay 26th, Burk's Falls 12th, ice, Ennismore 17th, DeCewsville 25th, Deseronto 26th, Ottawa 26th, Rockliffe 26th, Mattawa 26th, London 26th, Woodstock 26th, Biscotasing 25th, Denbigh 11th, St. Thomas 26th, Princeton, Warton 25th, Midland 25th, Georgetown 12th, Wyoming 26th, Thompson 12th.

QUEBEC.—Father Point 8th, Brome 26th, Richmond 12th, Chicoutimi 26th, St. Hyacinthe 26th, Point des Monts 11th.

NEW BRUNSWICK.—Fredericton 27th, Dalhousie 8th, St. Andrews 26th, Bathurst 8th, Chatham 8th

NOVA SCOTIA.—Truro 8th, ice  $\frac{1}{4}$  in., Sydney 9th.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF SEPTEMBER, 1894.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....			0.08	0.38	0.41	0.43	0.54	0.48	0.47	0.51	0.51	0.48	0.45	0.08		
AGASSIZ .....				0.04	0.05	0.18	0.27	0.34	0.45	0.46	0.39	0.37	0.19	0.05		
INDIAN HEAD .....																
BRANDON .....			0.09	0.38	0.42	0.50	0.64	0.70	0.65	0.58	0.54	0.47	0.38	0.12		
WINNIPEG .....			0.09	0.19	0.46	0.54	0.55	0.55	0.51	0.52	0.44	0.41	0.28	0.02		
WOODSTOCK .....			0.04	0.18	0.39	0.51	0.53	0.51	0.47	0.33	0.32	0.23	0.11			
TORONTO .....			0.14	0.45	0.51	0.57	0.65	0.67	0.67	0.69	0.75	0.62	0.52	0.15		
LINDSAY .....			0.07	0.17	0.46	0.58	0.57	0.59	0.59	0.53	0.43	0.27	0.28	0.21	0.01	
BARRIE .....			0.07	0.35	0.55	0.56	0.65	0.63	0.65	0.63	0.67	0.58	0.46	0.19	0.08	
KINGSTON .....			0.05	0.39	0.49	0.52	0.58	0.58	0.59	0.57	0.48	0.52	0.41	0.08		
MONTREAL .....			0.03	0.17	0.37	0.55	0.51	0.50	0.46	0.46	0.38	0.17	0.04			
FREDERICTON .....			0.11	0.22	0.41	0.51	0.61	0.61	0.69	0.65	0.64	0.51	0.39	0.19	0.08	

	ESQUIMALT.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.38	0.23	..	0.44	0.37	0.29	0.51	0.36	0.48	0.42	0.34	0.46
MAXIMUM DAILY AMOUNT.....	0.84	0.76	..	0.85	0.82	0.76	0.89	0.98	0.87	0.89	0.96	0.91
DATE.....	8-23	9	..	11	26	22	26	26	26	26	12	26
NO. OF DAYS COMPLETELY CLOUDED.....	7	12	..	5	6	8	0	6	2	5	7	5

### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 593. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	92	72	12	8	84.8
LOWER LAKE REGION.....	115	89	17	9	84.8
UPPER ST. LAWRENCE .....	97	78	12	7	86.6
LOWER ST. LAWRENCE.....	95	72	8	15	80.0
GULF.....	97	72	16	9	82.5
MARITIME PROVINCES .....	97	70	14	13	79.4
TOTAL.....	593	453	79	61	83.1

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions, the reports from all observing stations in Canada are used.

The daily probabilities were issued by Probability Officer R. F. Stupart.

### STORM WARNINGS.

During the month warnings on the approach of six storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 169, of which 154 were verified. At 4 stations the force exceeded, and at 21 did not reach that indicated by the signal displayed.

In connection with the warnings, predictions as to probable directions of the wind were given and of the 154 warnings verified as to force 144 were fully verified.

1. At 10 a.m. on the 9th Lake Superior stations were warned for a moderate S.W. to N.W. gale. The same night at 10.40 p.m. the warning was extended to the Georgian Bay and Lake Huron, and the following morning at 10.50 to Lakes Erie and Ontario. The warning was issued owing to the advance of a developing low area from the North-west Territories, and which as it afterwards passed over the Lakes gave a moderate gale pretty generally, except in the eastern end of Lake Ontario.

In advance of this same low area Father Point and Bay Stations were warned at 11 a.m. on the 10th for a moderate E. thro' N. to N.W. gale, but although a moderate gale afterwards prevailed the winds did not back as predicted, but veered through the southward. Signals were lowered on the Lakes at 10 p.m. on the 10th, and elsewhere at 10.40 a.m. on the 11th.

2. Lake Superior was warned at 10 p.m. on the 14th for a moderate S.W. to N.W. gale, owing to the advance of a depression from the far Northwest, and subsequently the agents reported that a southwest gale prevailed over the Lake. Signals were lowered at 10 p.m. on the 16th.

3. Lakes Erie, and Ontario as far east as Cobourg were warned at 4.10 p.m. on the 19th for a moderate easterly gale, a depression being then situated over the middle Atlantic States. Amherstburg and Port Dalhousie report that a moderate easterly gale occurred during the evening of the 19th. Signals were lowered at 10.20 a.m. on the 20th.

4. All Lake Stations were warned at 10 p.m. on the 22nd for a heavy S.W. to N.W. gale, a depression being then situated over Lake Superior, taken in conjunction with the advance of high pressure in its rear. On the 23rd a heavy gale from the S.W. to N.W. was experienced over the Lake Region, and the anemographs at Presqu'Isle, Pelee Island, Port Stanley and Toronto Island recorded 48, 45, 40 and 39 miles an hour respectively. The warning for this storm was further extended at 10 a.m. on the 23rd throughout Eastern Canada, but although a moderate gale afterwards prevailed in many localities, it only reached the force of a fresh or strong gale at Father Point and Ingonish. All signals were lowered at 11 a.m. on the 24th.

5. Lake Superior was warned at 10.10 p.m. on the 28th for a fresh southerly gale, and the following night at 10 p.m. the Georgian Bay and Lake Huron for a moderate S.W. to N.W. gale. The disturbance for which these warnings were issued afterwards on the 30th in its passage over the districts warned caused strong winds and gales from the directions indicated, and Port Arthur reports that the storm was a particularly heavy one for Thunder Bay. Signals were lowered at 10.45 a.m. on the 1st.

6. St. Lawrence and Ocean stations were warned at 10.45 a.m. on the 30th for a moderate easterly gale, as a disturbance was then travelling up the Atlantic Coast. The disturbance, however, did not ultimately prove to be of any great importance, but it nevertheless gave a moderate easterly and northeasterly gale over most of the districts notified, and Tignish and Ingonish report a fresh gale. Signals were lowered at 10.45 a.m. on the 1st.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR SEPTEMBER, 1894.

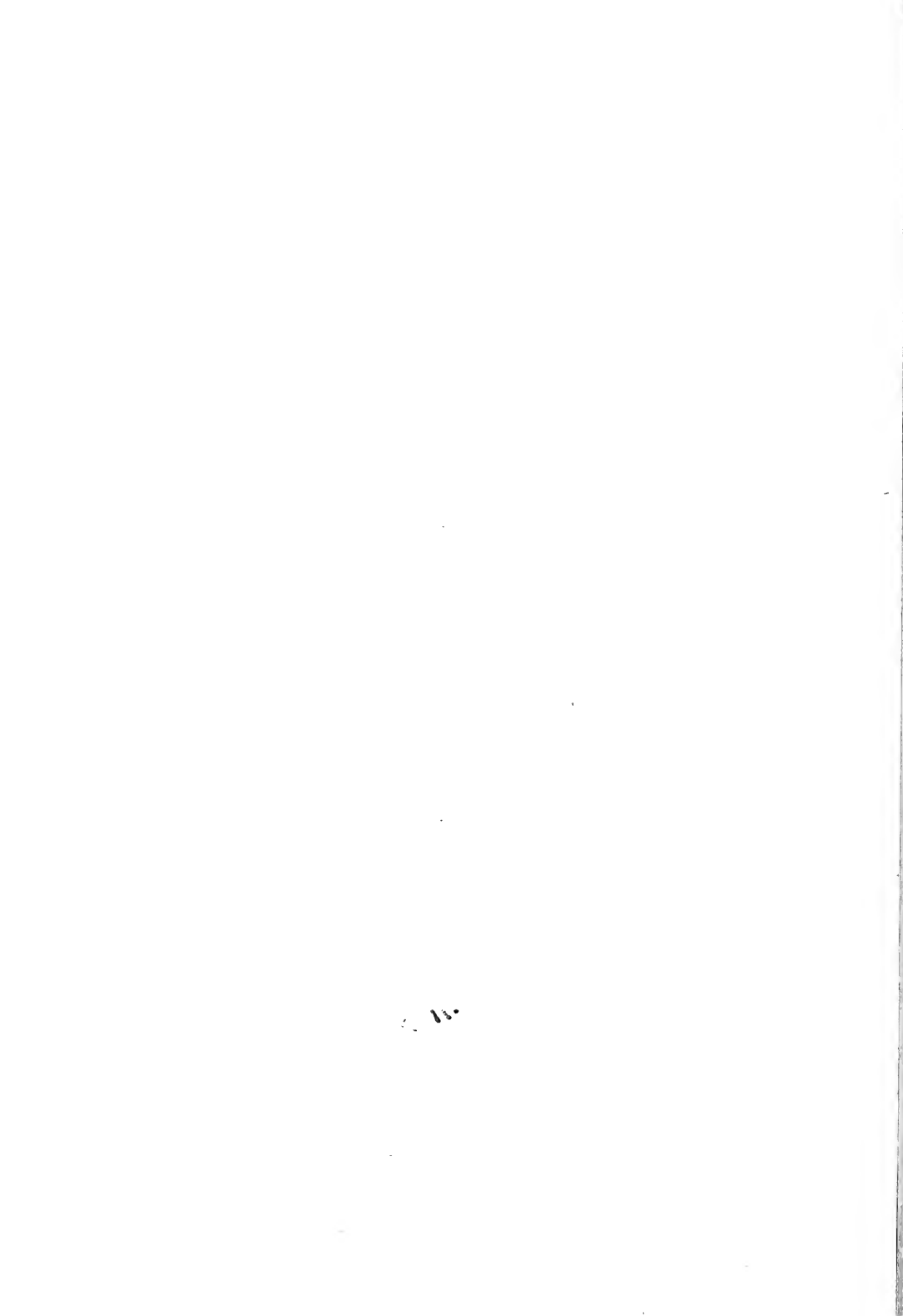
Mean declination.....	4° 43'6"
Increase westerly declination from September, 1893.....	5'7"
Horizontal force.....	0.16618 C.G.S.
Decrease.....	0.00005 "
Vertical force.....	0.60332 "
Decrease.....	0.00017 "

On the 1st a slight disturbance began at 6.30 p.m. and continued until 9 a.m. of the 2nd, after which a quiet period followed lasting up to 8 p.m. of the 4th, from which hour until 6 a.m. of the 5th small changes were registered. The magnets then remained very steady up to the evening of the 6th, when they became slightly disturbed and from 2 p.m. until 5 a.m. next day slow waves of disturbance were going on but there were no important departures from normal. On the evening of the 10th the magnets again became slightly disturbed and continued so until the afternoon of the 14th, when the movements gradually increased and by 6 p.m. an important storm was in progress and during the evening the following departures from the mean declination were recorded: 6.33 p.m., 57' east; 8.30 p.m., 19' west; 9.08 p.m., 40' east; 10.39 p.m., 35'7" west and at 0.33 a.m., 50' west. From 1 to 4 p.m. both components of the force increased gradually and decreased rapidly after 6 p.m., and from 8 p.m. until midnight both, particularly the horizontal, were considerably below the normal, the horizontal was greatest at 5.56 p.m., and least at 0.02 a.m., the range being 0.0095 C.G.S. The storm passed off after 3 a.m. of the 15th. The nights of the 15th, 16th and 17th were slightly disturbed. On the night of the 18th the movements increased and were still more marked on the following night and early morning of the 20th. From the 21st until the end of the month the magnets were seldom at rest, the most disturbed times were the mornings of the 22nd, 23rd and 28th, but there were no important departures from the mean with the exception of a westerly change in declination, which occurred shortly after midnight on the 27th and another of a similar character about 3.15 a.m. on the following morning.

On the 14th an aurora—Class II, was observed, and on the 27th faint auroral light in the North was observed between 10 p.m. and midnight. On the 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 16th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 28th, 29th and 30th the sky was clear but no aurora was observed. On all other nights the sky was overcast.

R. F. STUPART,  
*Acting Director.*

METEOROLOGICAL OFFICE,  
Toronto, 24th December, 1894.



## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

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# Monthly Weather Review.

OCTOBER, 1894.

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### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### ATMOSPHERIC PRESSURE.

The chart of mean atmospheric pressure for October shows the greatest departure below the normal ( $-15$ ) to have taken place over the western portion of the North-west Territories and to the north of the Lake district. It also ranged from  $-05$  to  $-10$  everywhere else excepting the eastern portion of the Maritime Provinces, Newfoundland and Bermuda where it was about or a little above normal.

The month on the whole may be said to have shown few important abnormal features; the storm which moved up the Atlantic Coast and was central near New York on the 10th, passing next day over Eastern Canada, being the most important feature of the month. Some of the cyclones took erratic courses; one from Manitoba taking a south-east track until it reached the Carolina Coast.

1st to 6th.—An anti-cyclone covered the Middle States, stretching north to Hudson's Bay on the 1st, and an extensive cyclone spread over the whole east slope of the Rocky Mountains, from Alberta to the Gulf of Mexico, rain being general in the west. The cyclone moved across the continent, and on the 2nd was central over Dakota. Rain soon set in over the Lake district, extending next morning as far east as Montreal, the cyclone being then central over the eastern portion of Lake Superior. From thence it moved slowly eastward, causing general unsettled weather and rain from the Lakes to the Atlantic until the 5th, when higher pressure and fairer weather followed, the depression moving over Labrador on the 6th.

In the North-west anti-cyclonic conditions and fair weather set in on the 3rd and continued until the 6th.

6th to 9th.—The anti-cyclone from the west extended to the Lakes and soon spread to Eastern Canada, giving a period of fine weather until the 8th over the Lakes, and until the 9th in Eastern Canada. In the meantime a cyclone had appeared over the north-west states on the 6th, which caused a fall of snow in Manitoba and Assiniboia and was, by the morning of the 8th, central to the north of Lake Huron. It gave some showers in the Lake and Eastern district on the 8th and 9th, and then passed off the Coast as an area of little importance.

9th to 11th.—An important cyclone which had moved in from the Gulf of Mexico was central over Georgia on the morning of the 9th. By next morning it was central near New York City, where it appeared as a small but intense cyclone, giving heavy winds, in many cases of hurricane force, and heavy rain. From thence it passed quickly over Eastern Canada with energy much diminished, but still sufficient to give a fresh to heavy gale throughout the Maritime Provinces and Eastern Quebec. Its influence extended westward to the Lakes, giving strong winds and moderate falls of rain. It passed over Labrador and Newfoundland on the 11th.

In the North-west the weather had been fair and mild, with no decided change in pressure.

11th to 15th.—Anti-cyclonic conditions and fair weather became more general everywhere on the 11th, but next day a slight depression from the North-west showed as a small elongated depression over Wisconsin. It soon developed over the Lakes into a cyclone of some importance, where it gave a general fall of rain and sleet and a moderate to fresh gale. From the Lakes the cyclone passed north-eastward, moving over Labrador on the 15th. It caused rain and a moderate to fresh gale throughout its course.

In the North-west the conditions were generally anti-cyclonic until the 13th, when the anti-cyclone following the last cyclone passed to the Lake district, where fair cool weather set in.

After the 13th in the North-west the pressure became more cyclonic, but the weather continued fine.

15th to 18th.—On the 15th pressure was generally of a cyclonic nature from the Rocky Mountains to the Atlantic. Next day a general decrease took place over the Lakes and Eastern Canada, owing to an extensive cyclone to the north, and unsettled showery weather became general in Ontario and the east, accompanied by strong S. W. and W. winds, the cyclonic conditions continuing from the Lakes eastward until the 18th with strong westerly winds and gradually clearing weather.

In the North-west an anti-cyclone set in on the 16th, with fine cool weather. It quickly dispersed, giving way to more cyclonic conditions; the weather, however, continuing fine.

18th to 23rd.—On the 18th an anti-cyclone developed over the Lakes and Eastern Canada, and fine weather became general from the Lakes to the Atlantic.

Anti-cyclonic conditions continued east of the Lakes until the 23rd, but slight barometric fluctuations on the 20th and 22nd slightly affected Ontario.

In the West and North-west the conditions were generally cyclonic, a depression moving slowly north-eastward causing showers in Manitoba. It dispersed on the 22nd.

23rd to 26th.—Slight differences in pressure over the lower lake district were the cause of rain in southern Ontario on the 23rd, but a general recovery in pressure took place and fine weather continued from the Lakes to the Atlantic until the 26th.

In the North-west cyclonic conditions which had moved in eastward from the Pacific Ocean, prevailed on the 24th, the weather continuing fair and mild with no precipitation. This was alternated by a slight increase in pressure.

26th to 31st.—A moderate cyclone which moved up the Gulf stream caused some rain in the Maritime Province on the 26th, but the pressure soon recovered itself, having changed but little; fine weather then being general from the Lakes to the Atlantic until the 30th.

In the North-west after the 26th generally low pressure prevailed owing to the developing of a cyclone over the Western States, which gave some light rain in Manitoba. The cyclone moved eastward and was succeeded by higher pressure and fine weather throughout the North-west. On reaching the Lake district it disturbed there the fine weather on the 30th, which became generally unsettled and wet. The cyclone extended to Eastern Canada on the 31st, when rainy weather set in there with strong winds or gales from the S. E. Strong winds and moderate gales were also caused by the same depression over the Lake district with somewhat fairer weather.

High pressure and cold weather in the North-west was succeeded on the night of the 29th by another cyclone which apparently came in from the British Columbia Coast. It caused high temperature but was unimportant and gave no precipitation.

#### TEMPERATURE.

The average temperature west of Manitoba has been above the normal, eastward it has in general been above the normal, the greatest excess occurring to Ontario.

*The Highest and Lowest Temperatures in each Province during October were:*

British Columbia, 71°·3 on 13th at Salmon Arm, 12°·0 on 19th at Princeton.

North-west Territories, 75°·1 on 15th at Medicine Hat, 10°·5 on 6th at Duck Lake.

Manitoba, 70°·5 on 15th at St. Albans (Aweme), 14°·0 on 29th at Brandon.

Ontario, 77°·5 on 25th at Lucknow, 17°·0 on 14th at Savanne.

Quebec, 66°·3 on 4th at Richmond, 24°·2 on 22nd at Father Point.

New Brunswick, 66°·6 on 4th at Grand Manan, 25°·0 on 15th at Bathurst.

Nova Scotia, 68°·4 on 4th at Halifax, 23°·5 on 24th at Sydney.

Prince Edward Island, 65°·8 on 5th at Georgetown, 33°·1 on 30th at Charlottetown.









## PRECIPITATION.

The precipitation throughout the Dominion has been slightly in excess of the normal, although at some of the stations the rainfall has been very small.

*The general distribution is as follows :—*

In British Columbia the rainfall was in general 6·30 in., or about 2·30 in. above the average.

In the North-west Territories, 0·85 in., about 0·04 in. below the average.

In Manitoba the rainfall was 1·66 in., or 0·52 in. above the average.

In Ontario, West and South-west District it was 3·14 in., or 0·27 in. above the average. In the North and North-west District it was 3·18 in., or 0·28 in. below the average. In the Central District it was 3·03 in., or 0·64 in. above the average, and in the East and North-east District it was 2·88 in., or 0·19 in. below the average.

In Quebec it was 3·90 in., or 0·36 above the average.

In New Brunswick it was 4·30 in., or 0·22 in. above the average.

In Nova Scotia it was 4·23 in., or 0·15 in. below the average.

In Prince Edward Island it was 4·49 in., or 0·27 in. above the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Port Simpson, 16·99 in.; Agassiz, 10·73 in.; Abbotsford, 10·13 in.; Hazelmore, 6·28 in.; Sproat Lake, 13·93 in.; Loch Erroch, 13·38 in.; Rivers Inlet, 14·78 in.; Canobie, 6·60 in.; New Westminster, 7·23 in.; Beaver Creek, 10·54 in.; Goldstream, 9·40 in.; Quamichan, 5·57 in.; Union, 5·59 in.; Langley, 8·11 in.

ONTARIO.—Port Arthur, 5·27 in.; Sprucedale, 5·40 in.; Clontarf, 5·24 in.

QUEBEC.—Bicquet, 5·91 in.

NEW BRUNSWICK.—Chatham, 5·16 in.; Parker's Ridge, 6·30 in.

NOVA SCOTIA.—Sydney, 5·47 in.

PRINCE EDWARD ISLAND.—Georgetown, 5·20 in.

NEWFOUNDLAND.—St. John, 6·36 in.; Channell, 6·13 in.

BERMUDA.—Prospect, 8·88 in.

*Rainfall one inch and upwards in 24 hours :—*

2. Hillview, 1·25 in.; Bancroft, 1·08 in.; Brandon, 1·00 in.; Wilton Grove, 1·10 in.; Belmont, 1·02 in.; Cartwright, 1·60 in.; Morden, 1·02 in.; Abbotsford, 1·33 in.; Georgetown, 2·23 in.; Port Arthur, 1·13 in.

3. Aurora, 1·98 in.; Huntsville, 1·13 in.; Bloomingdale, 1·45 in.; Georgetown, 1·63 in.; Princeton, 1·10 in.; St. Thomas, 1·20 in.; Ennismore, 1·10 in.; Watford, 1·10 in.; Denbigh, 1·13 in.; Lyons, 1·16 in.; Beaver Creek, 1·53 in.; Gretna, 2·05 in.; Pembina Crossing, 1·12 in.; Rathwell, 2·01 in.; Alton, 1·03 in.; Brantford, 1·10 in.; Loch Erroch, 3·04 in.; Agassiz, 2·72 in.; Langley, 1·26 in.; Hazelmore, 1·28 in.; Abbotsford, 2·97 in.; Conestogo, 1·52 in.; London, 1·48 in.; Lindsay, 1·02 in.; Elora, 1·23 in.; Renfrew, 1·40 in.; Woodstock, 1·71 in.

4. Parker's Ridge, 1·52 in.; Loch Erroch, 2·65 in.; Agassiz, 1·22 in.; Langley, 1·56 in.; Channell, 1·00 in.; Haileybury, 1·20 in.; Point Escuminac, 1·22 in.; Digby, 1·35 in.

5. Parker's Ridge, 1·03 in.; Wallace, 1·08 in.; Anticosti, W. P., 1·35 in.; Loch Erroch, 1·02 in.; Glacier, 1·05 in.; Channell, 1·50 in.; Bathurst, 1·00 in.; Halifax, 1·28 in.; Yarmouth, 1·56 in.; Grindstone, 1·33 in.; Anticosti, S.W.P., 1·00 in.

6. Sunshine, 1·05 in.

7. Savanne, 1·40 in.; Port Simpson, 2·54 in.

9. Parker's Ridge, 1·13 in.; Port Simpson, 1·23 in.; Point Escuminac, 1·07 in.; Port Hastings, 2·60 in.; Chatham, 1·23 in.; Cape Chatte, 1·00 in.; Sable Island, 1·25 in.

10. Denbigh, 1·00 in.; Whitehead, 1·45 in.

11. Channell, 1·05 in.

12. Port Simpson, 3·04 in.; Renfrew, 1·35 in.

13. Thompson, 1·13 in.; Denbigh, 1·13 in.; Port Simpson, 1·29 in.; Parry Sound, 1·08 in.

14. Parker's Ridge, 1·17 in.; Bathurst, 1·00 in.; Port Hastings, 2·10 in.

15. Bermuda, 1·58 in.

16. Sproat Lake, 1·10 in.; Port Simpson, 1·15 in.

17. Port Hastings, 1·10 in.; Dalhousie, 1·47 in.

18. St. Johns, 2·10 in.

21. Loch Erroch, 1'00 in.; Heron Bay, 1'15 in.
22. Sproat Lake, 1'15 in.; Agassiz, 1'22 in.; Port Simpson, 1'00 in.
23. Goldstream Lake, 1'08 in.
24. Waterford, 1'26 in.; Sproat Lake, 1'86 in.; Loch Erroch, 1'08 in.; Goldstream Lake, 1'22 in.; Rivers Inlet, 1'21 in.; Beaver Creek, 1'04 in.
25. Loch Erroch, 1'08 in.; Abbotsford, 1'20 in.; Rivers Inlet, 1'80 in.; Port Simpson, 1'35 in.; Bermuda, 2'85 in.
26. Sproat Lake, 1'16 in.
27. Yarmouth, 1'20 in.
28. Sproat Lake, 1'60 in.; Rivers Inlet, 1'03 in.
29. Sproat Lake, 1'10 in.; Agassiz, 1'10 in.; Union, 1'72 in.; Rivers Inlet, 3'08 in.; Beaver Creek, 1'10 in.; Port Arthur, 1'10 in.
30. Point Clark, 1'31 in.; Aurora, 1'10 in.; Wilton Grove, 1'11 in.; Presque'Isle, 1'00 in.; St. Thomas, 1'46 in.; Cowal, 1'14 in.; Coldstream, 1'13 in.; Watford, 1'30 in.; Thedford, 1'39 in.; Sproat Lake, 1'15 in.; Pelee Island, 1'00 in.; London, 1'07 in.
31. Ennismore, 1'03 in.; Orangeville, 1'00 in.; Sprucedale, 1'50 in.; Alton, 1'01 in.; Coldwater, 1'09 in.; North Bruce, 1'07 in.; Kingston, 4'01 in.; Parry Sound, 1'06 in.; Rockliffe 1'14 in.

## SNOWFALL.

Snow fell in the North-west and Manitoba to quite a large amount during the early part of the month, in British Columbia also some heavy falls are recorded during the month, in some of the Eastern Provinces snow fell about the middle of the month to a small amount.

BRITISH COLUMBIA.—Barkerville, 5 in.; Glacier, 26 in.; Donald, 8 in.

NORTH-WEST TERRITORIES AND MANITOBA.—Stony Mountain, 4 in.; Edmonton, 13 in.; Qu'Appelle, 15 in.; Minnedosa, 8 in.; Wallace, 14 in.; Rapid City, 14 in.; Norquay, 8 in.; Hartney, 9 in.; Rathwell, 7 in.; Rosebank, 4 in.; Morden, 5 in.; Chaplin, 8 in.; Brandon, 3 in.; Hillview, 6 in.; Treherne, 7 in.; Carman, 4 in.; and in many cases the snow melting as it fell was measured as rain.

*Snow 2 in. and upwards in 24 hours.*

1. Elkhorn, 5 in.; Chaplin, 5 in.
2. Elkhorn, 9 in.; Yorkton, 6 in.; Qu'Appelle, 10 in.; Minnedosa, 4 in.; St. Albans, 6 in.; Hillview, 6 in.; Moose Jaw, 4 in.; Pense, 6 in.; Brandon, 3 in.; Wallace, 10 in.; Foxton, 2 in.; Treherne, 7 in.; Carman, 3 in.; Rapid City, 10 in.; Norquay, 4 in.; Hartney, 5 in.; Rathwell, 7 in.; Rosebank, 4 in.; Mellendean, 4 in.; Morden, 5 in.; Portage la Prairie, 3 in.
3. Yorkton, 10 in.; Prince Albert, 4 in.; Qu'Appelle, 2 in.; Chaplin, 3 in.; Hartney, 2 in.; Norquay, 2 in.
5. Edmonton, 4 in.; Pincher Creek, 2 in.; Calgary, 3 in.; Wallace, 2 in.; Barkerville, 2 in.; Banff, 2 in.
6. Elkhorn, 6 in.; Yorkton, 7 in.; Medicine Hat, 2 in.; Qu'Appelle, 3 in.; Minnedosa, 4 in.; Rapid City, 6 in.; Brandon, 2 in.
8. Savanne, 2 in.; Heron Bay, 2 in.
9. Glacier, 3 in.
14. Uplands, 4 in.
15. Richmond, 2 in.
18. Edmonton, 4 in.
19. Prince Albert, 4 in.; Glacier, 2 in.
20. Quesnelle, 2 in.
22. Glacier, 2 in.
23. Donald, 6 in.; Glacier, 3 in.
24. Edmonton, 3 in.; Donald, 2 in.; Glacier, 3 in.
26. Glacier, 2 in.
28. Glacier, 3 in.
30. Barkerville, 3 in.
31. Glacier, 2 in.

*Thunder recorded on the following dates—*

1. Bermuda.
2. Galt, Bermuda.
3. Whiteside, Galt, Cottam, Welland, Brantford, Alton, Uplands, Peterborough, Durham, Presqu'Isle, Georgetown (Ont.), Blenheim, Beatrice, Brome, Lindsay, Toronto, Stratford, Lucknow, Paris, Stony Creek, Port Dover, Port Rowan.
4. Welland, Peterborough, Blenheim, Thompson, Brome, Richmond, Port Stanley.
5. Bermuda, Port Stanley, Port Rowan.
6. St. Albans, Belmont, Bermuda.
11. Fredericton, Port Rowan.
13. Pelee Island, Welland, Stony Creek, Bermuda, Port Rowan.
14. Clontarf.
15. Port Simpson, Bermuda.
16. Bancroft, St. Hyacinthe, Haileybury, Shannonville, Bermuda.
17. Brome, Georgetown, Bermuda, Grand Manan, Charlottetown, Grindstone, Fredericton, Pictou.
18. Bermuda.
20. Savanne, Cottam, Welland, Wyoming, Scarborough, Georgetown (Ont.), St. Mary's, Lucknow, Thorold, Stony Creek, Port Stanley, Port Rowan.
21. Selkirk, Sproat Lake.
22. Cottam, Welland, Haliburton, Mount Forest, Wiarton, Thedford, Bognor, Point Clark, Sproat Lake, Birnam, St. Mary's, Lucknow, Haileybury.
23. Cottam, Sunshine, Quebec.
25. Bermuda.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV'), the feeblest in brilliancy.*

1. Yorkton, III.
2. Chicoutimi, III. ; Point Escuminac, III ; Quebec, III ; St. Andrews, IV ; Fredericton, III.
3. Alameda, III ; Yorkton, ; III.
4. Hillview, I ; Fort Steele, IV ; Elkhorn, II.
5. Gravenhurst, IV ; Pincher Creek, Prince Albert, III ; St. Andrews.
6. Gravenhurst, IV ; Alameda, IV ; Truro, IV ; Haileybury, IV.
7. Hillview, IV ; Pembina Crossing, III.
8. Hillview, IV ; Pembina Crossing, III ; Savanne, St. Albans.
10. Hillview, IV.
12. Point Escuminac, IV.
13. Hillview, III ; Pembina Crossing, IV.
14. Moose Jaw, IV ; Alameda, IV ; Minnedosa, IV.
15. Pembina Crossing, IV ; St. Albans, II ; Duck Lake.
16. Hillview, I ; Moose Jaw, II ; Portage la Prairie, St. Albans, III ; Alameda, IV ; Yorkton, II.
17. Savanne, Port Arthur, II.
18. Savanne, Elkhorn, II.
19. Welland, III.
20. Chicoutimi, Father Point, III.
21. Hillview, IV ; Pembina Crossing, IV ; Haileybury, IV ; Truro, IV ; Chicoutimi.
22. Savanne, Father Point, III.
23. Gravenhurst, IV ; Savanne, Portage la Prairie, Fort Steele, III.
24. Pembina Crossing, IV ; Savanne, St. Albans, II.
25. Minnedosa, III ; Anticosti, III ; Hillview, II ; Moose Jaw, IV ; Gravenhurst, IV ; Duck Lake, Midland, II ; Thedford, III ; Durham, IV ; Haileybury, III ; Truro, III ; Chicoutimi, III ; Lucknow, IV.
26. Gravenhurst, IV ; Savanne, Minnedosa, I.
27. Moose Jaw, IV ; Pembina Crossing, IV ; Truro, IV.
28. Moose Jaw, IV.

29. Hillview, III; Moose Jaw, IV; Portage la Prairie, St. Albans, III; Channell, IV; Alameda, IV; Haileybury, IV; Truro, IV; Chicoutimi, IV; Georgetown, Point Escuminac, II; Quebec, III; Father Point, III; Fredericton, II.

30. Pembina Crossing, III; St. Albans, III; Channell, IV; Fort Steele, IV; Truro, III; Georgetown, Point Escuminac, IV; St. Andrews, I; Father Point, IV; Charlottetown, IV; Grindstone, III.

31. Hillview, IV; Pembina Crossing, IV; Haileybury, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF OCTOBER, 1894.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT .....			0 01	0 08	0 29	0 36	0 38	0 33	0 36	0 45	0 42	0 32	0 12			
AGASSIZ, B. C. ....			s	05	13	21	25	25	25	28	23	18	01			
BRANDON.....			00	12	32	41	45	49	50	47	42	40	17			
INDIAN HEAD.....																
WINNIPEG.....			04	28	48	56	61	55	57	45	46	39	10			
WOODSTOCK.....				08	21	37	52	55	55	54	55	45	18			
TORONTO.....			02	24	32	38	42	49	61	64	57	52	29	01		
LINDSAY.....			05	25	37	35	46	54	49	49	41	29	26	06		
BARRIE.....			02	22	36	36	41	45	50	49	45	44	30	02		
KINGSTON.....			03	24	36	42	51	51	55	50	46	48	25	8		
MONTREAL.....					04	18	26	39	38	36	23	20	07			
FREDERICTON .....			s	20	35	39	49	41	48	42	46	43	35	03		

	ESQUIMALT.	AGASSIZ.	BRANDON.	INDIAN HEAD.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0 28	0 13	0 42		0 42	0 36	0 41	0 37	0 37	0 39	0 21	0 37
MAXIMUM DAILY AMOUNT.....	0 84	0 72	0 81		0 91	0 81	0 91	0 96	0 91	0 90	0 83	0 90
DATE .....	6	6	16		29	29	18	7	1	18	22	28
NO. OF DAYS COMPLETELY CLOUDED .....	9	11	12		7	3	1	5	5	5	11	8

#### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 675. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	99	63	18	18	72.7
LOWER LAKE REGION.....	125	89	14	22	76.8
UPPER ST. LAWRENCE.....	111	73	18	20	73.9
LOWER ST. LAWRENCE.....	109	75	16	18	76.1
GULF .....	115	77	20	18	75.7
MARITIME PROVINCES .....	116	89	18	9	84.5
TOTAL .....	675	466	104	105	76.7

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer H. V. Payne.

### STORM WARNINGS.

During the month warnings on the approach of 12 storms were issued to our agents and cautionary signals displayed at the various signal stations. The total number of warnings issued was 342, of which 247 were verified. At 33 stations, however, the force exceeded, and at 17 did not reach that indicated by the signals.

In connection with the warnings, predictions as to the probable directions of the wind were given, and of the 247 warnings verified as to force, 204 or 82·6 per cent were fully and 241 or 97·6 per cent were fully and partly verified as to direction.

No. 1.—At 10.30 a.m. in advance of a storm centre moving eastward across the North-west States, signal No. 4 was ordered for stations on Lakes Huron and Erie, and No. 2 for stations on Lake Ontario. During that same evening the wind was strong from the eastward on all the Lakes and next day a moderate to fresh south and south-west gale blew at almost all stations warned. Signals were lowered early on the 4th.

No. 2.—During the 6th there was a storm centre developing over the North-west States, and at 10.15 p.m. warning of a moderate easterly gale was despatched to Lake Superior. On the following morning at 10.15 a.m. signal No. 4 was ordered for Lakes Superior and Huron, and No. 2 for Lakes Erie and Ontario. A south-westerly gale was pretty general on Lake Superior on the 7th, and on the 8th there was a moderate to fresh south-westerly and westerly gale on all the Lakes. At 4 p.m. of the 8th as the storm was passing down the St. Lawrence Valley with diminishing energy, signal No. 2 was ordered for stations near the mouth of the St. Lawrence and in the Bay of Chaleur, and during the night a moderate westerly gale prevailed generally over the northern part of the Gulf. Signals were lowered at Lake stations at 10.30 p.m. of the 8th and at Gulf stations at 10.15 p.m. of 9th.

No. 3.—At 10.15 a.m. of the 8th as there was a developing storm over the Canadian North-west Territories, Port Arthur was warned to expect a moderate gale from a westerly direction, but as the storm dispersed there was no gale on Lake Superior and signals were lowered at noon on the 9th.

No. 4.—On the evening of the 9th, in advance of a tropical storm then centred near Cape Hatteras, signal No. 1 was ordered for stations on the Bay of Fundy. At 10.30 a.m. of the 10th, as this storm was moving north, signals indicating a heavy easterly gale were ordered for all stations in the Gulf of St. Lawrence and in Nova Scotia east to the Gut of Canso, and at 3.45 p.m. they were extended to Cape Breton. A fresh to strong easterly to south easterly gale had begun in the more Western districts by noon of the 10th, and before night was general throughout Eastern Canada. Early on the 11th the wind hauled to the south-west as the storm centre passed to the northward of the Gulf, and signals were lowered shortly after noon.

On account of this same storm at 10.20 a.m. of the 10th, signals indicating a moderate westerly gale were ordered for Lake Ontario stations from Port Hope east, and on the following day while the storm centre was to the northward of the St. Lawrence a fresh westerly gale blew throughout the Lower Lake Region. Signals were lowered during the afternoon of the 11th.

No. 5.—On the morning of the 13th there was a developing storm centre over the Lake Region, and at 10.15 a.m. signals indicating a heavy north and north-west gale were ordered for all lake stations except Port Arthur, and at 11.15 all stations in the Gulf and Maritime Provinces were warned to expect a moderate gale, at first from an easterly direction. On the Upper Lakes the gale began early that forenoon, but on Lake Ontario not until the following day; it was heavy in all parts of the Lake Region, and on the 14th was accompanied by snow squalls. In the Gulf and Maritime Provinces an easterly gale began early on the 14th, continuing until night, after which the wind hauled to the south-west and west, from which directions there was a fresh to heavy gale at most points. At 4 p.m. prior to the change of wind, signal No. 2, indicating a westerly gale, was substituted for No. 1. Safety telegrams were sent to lake stations during the forenoon of the 14th and to the Maritime Provinces during the afternoon of 15th.



No. 6.—At 4.35 p.m. of the 14th, Port Arthur was warned of a moderate easterly gale, but no gale followed and signals were lowered during the forenoon of the 15th.

No. 7.—At 10.45 a.m. of the 17th stations in the Bay of Chaleur and northern part of the Gulf were warned of a heavy westerly gale, and during that night and the following day a westerly and north-westerly gale prevailed very generally in the districts warned. Signals were lowered about noon on the 18th.

No. 8.—At 10 p.m. of the 18th, Lake Superior stations were warned of a moderate easterly gale. Sault Ste. Marie reported a moderate north-easterly gale during the night of the 19th, but at Port Arthur there was no storm. Signals were lowered early on the 22nd.

No. 9.—At 10.15 p.m. of the 25th all lake stations were warned of a heavy southerly to westerly gale, but the storm centre dispersed and no storm occurred. Signals were lowered early on the 27th.

No. 10.—On the evening of the 25th there was a storm at sea off the Middle Atlantic Coast, and at 10.45 p.m. signal No. 1 was ordered for ports in Nova Scotia and Southern New Brunswick. Next morning as the storm seemed to be developing, No. 3, indicating a heavy gale, was ordered for all stations in the Gulf and Maritime Provinces. The storm centre passed east far to the southward of Nova Scotia, and although a heavy north-easterly gale occurred during the night of the 26th and early morning of the 27th in Cape Breton, the storm was not general in the Maritime Provinces. Signals were lowered on the 27th.

No. 11.—On the evening of the 27th there was a developing storm centre over the North-west States, and at 10.20 p.m. Lake Superior stations were warned to expect a moderate east veering to south-west gale. At 10.40 a.m. signal No. 4 was substituted for No. 1 at Port Arthur and No. 1 was ordered for the Georgian Bay and Lake Huron. Sault Ste. Marie reports a moderate south-east gale during the afternoon of the 28th and Port Arthur a fresh north-west gale during the night of the 29th, but in other parts of the Lake Region the wind did not exceed a strong breeze. Signals were lowered early on the 30th.

No. 12.—During the forenoon of the 31st, signal No. 2 for a moderate westerly gale was ordered for all lake stations, and No. 3 for a heavy easterly gale for stations in the Gulf of St. Lawrence and Maritime Provinces. A fresh westerly gale prevailed that night in all lake districts except the west end of Lake Superior, while at the same time a moderate to fresh south-easterly gale prevailed on the Bay of Fundy and more northern portions of the Gulf of St. Lawrence.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR OCTOBER, 1894.

Mean westerly declination.....	4° 44' 1
Increase from October, 1893.....	5' 9
Mean horizontal force.....	0° 16623
Increase from October, 1893.....	00004
Mean vertical force.....	0° 60220
Decrease from October, 1893.....	0° 00106

The magnets were steady on the 1st and up to 9 a.m. of the 2nd, after which hour slight disturbing action was registered until the afternoon; it appeared again after 6 p.m., and continued until 10 a.m. of the 3rd, after which a quiet period followed, lasting until 6.20 a.m. of the 4th, when another small disturbance set in. The most conspicuous movements were two westerly swings of the declination magnet at 1.35 and 4.25 a.m. of the 5th, the extreme in each instance being 9' west of the normal. The force magnets show little change during these hours.

From 10 a.m. of the 5th until the afternoon of the 6th an exceptionally steady magnet was registered. During the afternoon of the 6th a small disturbance sprang up and lasted off and on until the morning of the 10th. After this there was nothing worthy of comment until 11.50 p.m. of the 13th, when the declination needle moved 10' west of normal, the extreme occurring at 0° 10 a.m. of the 14th. On the night of the 14th slight disturbing action again began, and from this time until the end of the month the magnets were seldom at rest. The only movement, however, which calls for any special comment was a westerly change of the declination needle amounting to 15', which took place at 2.40 a.m. of the 26th, the reading then being 13' west of the normal.

The month was one of the quietest we have had for some time.

On the 1st, 4th, 7th, 11th, 13th, 17th, 18th, 20th, 21st, 22nd, 26th, 27th and 29th the sky was clear, but no aurora was observed, on all other nights clouds or haze would have hidden any aurora which may have existed.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, January, 1895.

It is with deep regret that we announce the death of Mr. C. Carpmal, the Director of the Magnetic Observatory, Toronto, and of the Meteorological Service of Canada, which appointment he had held since the resignation of Professor Kingston, in January, 1880. He had been compelled for some time to relinquish the active discharge of his duties from continued ill health. His death took place on the 20th October, 1894, at Hastings, England.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

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# Monthly Weather Review.

NOVEMBER, 1894.

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### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

Pressure was below normal over Canada from Manitoba east to the Atlantic, and as much as 0.10 of an inch in the Gulf of St. Lawrence. Throughout the western portion of the Continent and in the Middle Pacific States it was from 0.07 to 0.09 of an inch above normal, and 0.10 of an inch and upwards along the Washington Territory and the British Columbian Coasts.

Twelve low pressure areas were traced, and with one exception they all came from the Northwestward.

The first depression noted and the only one which came from the Southwestward, was situated in Northern Texas on the morning of the 1st. It travelled Northwestward with increasing energy, and between the 2nd and 3rd passed over the Lake Region and the St. Lawrence Valley, giving strong winds and gales generally from the Lakes to the Atlantic, as well as rain, and the latter was quite heavy in Quebec and the Maritime Provinces.

A shallow depression which passed over the North-west Territories between the 2nd and 3rd reached the Lower Lakes on the 4th, and gave some light rains. On the morning of the 5th it was situated over the Middle Atlantic Coast, its energy in the meantime having become greater, and during the day it travelled up the Atlantic Coast continuing to increase very much in energy, and on the 6th it passed along the Nova Scotia Coast, causing a very heavy gale throughout Eastern Canada, accompanied north to the Miramichi by heavy snow and rain, chiefly the latter.

The next depression, a shallow one, gave a few light falls of rain or snow in the North-west between the 5th and 7th, and then as it passed to the southward of the Lower Lakes it brought a fall of snow over Lake Erie during the night of the 7th.

On the 8th, a low area with its energy increasing, traversed the Northwest Territories, giving local snow falls. It afterwards brought a fall of snow between the 9th and 10th in the Lake Region and the St. Lawrence Valley and rain in the Maritime Provinces.

An important anti-cyclone attended by cold weather moved in the immediate rear of the depression, and gave zero temperatures in Manitoba on the morning of the 10th, and to the eastward in all other portions of Canada, as the winds veered to the west and northwest they increased, owing to its influence, to strong winds and gales pretty generally, and the weather turned quite cold for two or three days.

The passage of a depression over the Northwest on the 11th caused there some fairly heavy falls of sleet and rain. On the 13th it brought mild weather and sleet and rain over Ontario, and on the 14th a similar sequence of weather conditions in Quebec and the Maritime Provinces, the precipitation being heavier along the Nova Scotia Coast than elsewhere.

Some local falls of rain or snow occurred in the Northwest on the 14th, during the passage of a rather important low area, and on the following day in its rapid eastward advance it gave a few

showers as far as the Atlantic Coast, and the wind in many places blew a strong breeze or a gale from the south-west, more especially over the Lower Lake Region.

A depression of feeble energy traversed the Northwest on the 17th, attended by a few snow flurries, a very important anti cyclone however followed in its immediate rear, and as the winds shifted to the northwest and north they increased to fresh and heavy gales and the weather turned decidedly cold, and on the morning of the 20th temperature was generally much below zero, and as low as  $-22$  in the North Saskatchewan Valley.

The depression after passing the Lower Lakes on the night of the 18th suddenly developed much greater energy, and this, combined with the important anti cyclone following in its rear, caused a gale of great violence from the west and northwest over the Gulf of St. Lawrence and off the Atlantic Coast generally. The cold weather accompanying the anti cyclone was severely felt in all portions of Canada, and Northern Ontario and Quebec had minimum temperature below zero.

An area of depression gave a fall of snow in the Northwest on the 19th, accompanied by high winds. On the 20th it passed into the Lake Region and brought some local sleet or rain almost entirely confined to the Georgian Bay district. It also caused some light falls of snow or rain along the St. Lawrence, and on the 21st a general and moderately heavy rainfall in the Maritime Provinces.

Between the 21st and 25th as many as three depressions, of little energy however, made their presence felt by the several falls of rain or snow that they gave over different portions of the country, but in no place was the amount of precipitation at all large.

On the 25th snow fell over the Northwest Territories during the passage of a depression which had travelled from the Pacific Ocean. On the morning of the 26th it was centred near Lake of the Woods with its energy increasing, and at the same time an anti cyclone was spreading over the Northwest Territories accompanied by decidedly cold weather. The anti cyclone quickly became very important and the temperature in Manitoba fell to  $-26^{\circ}$ ; the depression also increased a good deal in energy, and as both high and low areas moved across the Continent, the weather at first from the Lakes to the Atlantic was mild with some snow or rain, chiefly in Quebec and the Maritime Provinces, and was followed by a heavy westerly and northwesterly gale and decidedly colder weather which set in the night of the 27th in Ontario, and next day over Quebec and the Maritime Provinces. On the early morning of the 29th in Ontario and at night in Quebec, the temperature fell below zero, and on the 30th the weather moderated.

#### TEMPERATURE.

The temperature, except in British Columbia and part of the Northwest Territories, has been below the normal, but not to any great amount.

*The Highest and Lowest Temperatures in each Province during November were :*

British Columbia,  $78^{\circ}0$  on 6th at Princeton,  $-12^{\circ}6$  on 26th at Stuart's Lake.

Northwest Territories,  $72^{\circ}7$  on 11th at Medicine Hat,  $-26^{\circ}0$  on 28th at Oonikup.

Manitoba,  $50^{\circ}0$  on 3rd at Fort Osborne,  $-32^{\circ}0$  on 28th at Oakbank.

Ontario,  $71^{\circ}0$  on 2nd at Thorold,  $-35^{\circ}0$  on 28th at Barclay.

Quebec,  $56^{\circ}0$  on 3rd at Brome,  $-5^{\circ}5$  on 30th at Richmond

New Brunswick,  $59^{\circ}0$  on 2nd at Bathurst,  $-4^{\circ}0$  on 20th at Dalhousie.

Nova Scotia,  $62^{\circ}0$  on 1st at Truro,  $-10^{\circ}3$  on 20th at Truro.

Prince Edward Island,  $57^{\circ}2$  on 1st at Charlottetown,  $11^{\circ}0$  on 20th at Charlottetown.





[illegible]

## PRECIPITATION.

The rainfall in Prince Edward Island, Nova Scotia, Manitoba and British Columbia was above the normal, in the other Provinces of the Dominion it was below the normal, the greatest defect occurring in the S. W. and Central districts of Ontario.

*The general distribution is as follows :—*

In British Columbia the rainfall was in general 4'90 in., or about 1'50 in. above the average. In some parts of the interior little or no rain has fallen.

In the North-west Territories the rainfall was 0'08 in., or about the average quantity.

In Manitoba the rainfall was 0'38 in., or about 0'26 in. above the average quantity.

In Ontario, West and South-west District it was 0'70 in., or 1'50 in. below the average. In the North and North-west District it was 0'87 in., or 0'96 in. below the average. In the Central District it was 0'47 in., or 1'47 in. below the average. And in the East and North-east District it was 1'10 in., or 0'69 in. below the average.

In Quebec it was 1'25 in., or 0'41 in. below the average.

In New Brunswick it was 1'92 in., or 1'28 in. below the average.

In Nova Scotia it was 4'39 in., or 0'26 in. above the average.

In Prince Edward Island it was 4'19 in., or 1'20 in. above the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Port Simpson, 23'90 in.; Kuper Island, 5'69 in.; Esquimalt, 6'88 in.; Rivers Inlet, 17'53 in.; Loch Erroch 12'71 in.; Canobie, 6'73 in.; Beaver Creek, 6'50 in.; New Westminster, 8'05 in.; Duncan's Station, 6'08 in.; Langley, 8'30 in.; Union, 5'08 in.; Salt Spring Island, 5'18 in.; Goldstream Lake, 8'63 in.; Sproat Lake, 7'12 in.; Abbotsford, 9'07 in.; Agassiz, 10'27 in.; Hazlemere, 7'85 in.

NOVA SCOTIA.—Sydney, 5'05 in.; Halifax, 5'40 in.; Port Hastings, 9'05 in.

*Rainfall one inch and upwards in 24 hours :—*

1. Abbotsford, 1'13 in.; New Westminster, 1'35 in.
2. Agassiz, 1'03 in.; Langley, 1'01 in.; Loch Erroch, 1'24 in.; Rivers Inlet, 1'52 in.
4. Rivers Inlet, 2'26 in.
5. Abbotsford, 1'10 in.; Goldstream Lake, 1'17 in.; Loch Erroch, 1'08 in.
6. Pictou, 1'36 in.; Halifax, 1'50 in.
7. Port Simpson, 1'14 in.
8. Port Simpson, 3'45 in.
9. Port Simpson, 2'50 in.
10. Port Simpson, 1'65 in.; Rivers Inlet, 2'14 in.
13. Rivers Inlet, 1'27 in.
14. Truro, 1'07 in.; Port Hastings, 2'90 in.; Digby, 1'00 in.
17. Hazlemere, 1'04 in.; Loch Erroch, 1'10 in.
18. Port Simpson, 3'05 in.; Beaver Creek, 1'45 in.; Rivers Inlet, 1'47 in.
19. Port Simpson, 1'25 in.
20. Port Simpson, 1'12 in.; Rivers Inlet, 1'08 in.
21. Port Simpson, 1'11 in.; Rivers Inlet, 1'39 in.
22. Port Hastings, 1'90 in.; New Westminster, 1'38 in.
24. Esquimalt, 1'77 in.; Agassiz, 1'35 in.; Abbotsford, 1'69 in.; Salt Spring Island, 1'13 in.; Loch Erroch, 1'72 in.
25. Langley, 1'34 in.; Canobie, 1'10 in.
27. Abbotsford, 1'30 in.; New Westminster, 1'15 in.
28. Port Simpson, 1'09 in.; Langley, 1'25 in.

## SNOWFALL.

The snowfall in Ontario, Quebec and New Brunswick was above the normal, in the other Provinces it was below, although at some stations an extraordinary quantity has been recorded.

*The distribution is as follows :—*

In the same Districts of Ontario as shown in the rainfall, the amounts are 15'2 in., or 6'6 in. above the average; 16'9 in., or 0'9 in. above the average; 6'1 in., or 0'1 in. above the average; 7'3 in., or 1'2 in. below the average.



In Quebec it was 17·7 in., or 5·5 in. below the average.

In New Brunswick it was 13·9 in., or 5·2 in. above the average.

In Nova Scotia it was 2·7 in., or 1·3 in. below the average.

In Prince Edward Island it was 13·9 in., or 5·2 in. above the average.

In Manitoba it was 8·0 in., or about 2·7 in. above the average.

In the North-west Territories it was 5·6 in., or 1·6 in. below the average.

In British Columbia the fall varied from none on the Coast to 10·4 in. in the interior, or about 11 in. on the average, or 8 in. less than in November, 1893.

*Snowfall 6 inches and upwards during the month.*

BRITISH COLUMBIA.—Spence's Bridge, 12 in.; Keremeos, 18 in.; Barkerville, 26 in.; Glacier, 10·4 in.; Quesnelle, 17 in.; Donald, 41 in.; Princeton, 19 in.; Stuart's Lake, 23 in.; Pilot Bay, 7 in.; Nicola Lake, 8 in.; Goldstream Lake, 6 in.; Mission Valley, 9 in.; Enderby, 6 in.; Kaslo, 9 in.; Fort Steele, 7 in.

NORTH-WEST TERRITORIES.—Calgary, 10 in.; Pincher Creek, 7 in.; Alameda, 8 in.; Duck Lake, 8 in.; Calgary (2) 11 in.; Edmonton, 10 in.; Wallace, 11 in.; Henrietta, 6 in.

MANITOBA.—Minnedosa, 10 in.; Winnipeg, 18 in.; Hillview, 14 in.; Channel Island, 14 in.; Oakbank, 16 in.; Mellendean, 6 in.; Brandon, 6 in.; Shoal Lake, 12 in.; Cartwright, 7 in.; Gretna, 11 in.; Foxton, 6 in.; Hartney, 12 in.; Norquay, 6 in.; Emerson, 13 in.

ONTARIO.—Woodstock, 16 in.; London, 19 in.; Coldwater, 17 in.; Lindsay, 12 in.; Ottawa, 10 in.; Stratford, 19 in.; Durham, 38 in.; Haileybury, 22 in.; Parry Sound, 25 in.; White River, 13 in.; Port Dover, 17 in.; Port Stanley, 17 in.; Port Arthur, 10 in.; Saugeen, 21 in.; Thompson, 7 in.; Wyoming, 23 in.; Cowal, 8 in.; Mount Forest, 21 in.; Huntsville, 8 in.; Waterford, 21 in.; Denbigh, 12 in.; Princeton, 18 in.; Aurora, 10 in.; Georgetown, 8 in.; Thedford, 34 in.; Midland, 6 in.; Presque-Isle, 23 in.; Wiarton, 15 in.; Sunshine, 14 in.; Coldstream, 28 in.; Goderich, 19 in.; Watford, 24 in.; Orangeville, 10 in.; Mattawa, 7 in.; Biscotasing, 13 in.; Missanabie, 24 in.; Barclay, 22 in.; Heron Bay, 20 in.; Schreiber, 26 in.; Savanne, 17 in.; Sault Ste. Marie, 23 in.; Whiteside, 16 in.; Sprucedale, 12 in.; Galt, 14 in.; Elora, 14 in.; Vigil, 6 in.; Lakefield, 8 in.; Burk's Falls, 13 in.; Peterborough, 13 in.; Clontarf, 15 in.; Brantford, 11 in.; DeCewsville, 14 in.; Lucknow, 19 in.; Bancroft, 12 in.; Alton, 9 in.; Cartier, 7 in.; Conestogo, 12 in.; Gravenhurst, 12 in.; Birnam, 33 in.; Stony Creek, 6 in.; Beatrice, 15 in.; St. Mary's, 15 in.; Haliburton, 10 in.; St. George, 14 in.; Bognor, 22 in.; Chatham, 9 in.; Orillia, 14 in.; Paris, 16 in.; North Bruce, 10 in.; Point Clark, 15 in.; Georgina, 9 in.; Owen Sound, 25 in.; Uplands, 23 in.; Nepigon, 14 in.

QUEBEC.—Father Point, 13 in.; Quebec, 18 in.; Grindstone, 44 in.; Montreal, 11 in.; Bicquet, 31 in.; Chicoutimi, 14 in.; Cape Magdalen, 10 in.; Richmond, 10 in.; Point des Monts, 36 in.

NEW BRUNSWICK.—Bathurst, 8 in.; Grand Manan, 8 in.; Chatham, 14 in.; Fredericton, 16 in.; St. John, 16 in.; St. Andrews, 10 in.; Parker's Ridge, 25 in.; Dalhousie, 14 in.; Point Lepreaux, 12 in.; Point Escuminac, 7 in.

*Snowfall 3 in. and upwards in 24 hours.*

1. Shoal Lake, 8 in.; Cape Chatte, 3 in.; Missanabie, 6 in.; Barkerville, 4 in.
2. Donald, 7 in.; Glacier, 6 in.
3. Point des Monts, 5 in.; Glacier, 4 in.; Barkerville, 4 in.
4. Glacier, 4 in.
5. Denbigh, 3 in.; Brome, 3 in.; Donald, 4 in.; Glacier, 12 in.
6. Bathurst, 6 in.; Fredericton, 10 in.; St. John, 7 in.; Wyoming, 8 in.; Thedford, 4 in.; Parker's Ridge, 12 in.; Point Lepreaux, 12 in.; Point Escuminac, 3 in.; Grand Manan, 13 in.; Chatham, 8 in.; St. Andrews, 8 in.; Grindstone, 8 in.; Donald, 6 in.; Glacier, 6 in.
7. Cape Magdalen, 3 in.; Grindstone, 4 in.
8. Winnipeg, 3 in.; Channel Island, 6 in.; Paris, 5 in.
9. Winnipeg, 4 in.; London, 3 in.; Stratford, 7 in.; Oakbank, 3 in.; Waterford, 21 in.; Princeton, 10 in.; Presque Isle, 12 in.; Scarborough, 4 in.; Mellendean, 3 in.; Oakbank, 3 in.; Nepigon, 3 in.; St. Mary's, 6 in.; Alton, 3 in.; Bancroft, 4 in.; Brantford, 11 in.; Paris, 9 in.; Point Clark, 3 in.; Galt, 6 in.; Barclay, 4 in.; Birnam, 3 in.; Port Arthur, 4 in.; Grindstone, 5 in.; Halifax, 31 in.
10. Woodstock, 7 in.; Ottawa, 4 in.; Emerson, 3 in.; Cowal, 3 in.; Georgetown, 4 in.; Thedford, 3 in.; Wiarton, 5 in.; Goderich, 4 in.; Parker's Ridge, 4 in.; Bicquet, 6 in.; Richmond, 5 in.; St. George, 7 in.; Bognor, 8 in.; Chatham, 3 in.; Welland, 3 in.; DeCewsville, 10 in.; Lakefield, 4 in.; Vigil, 4 in.; Birnam, 8 in.; Stony Creek, 3 in.; Montreal, 7 in.; Quebec, 4 in.; Kingston, 3 in.; Port Dover, 7 in.; Port Stanley, 6 in.

11. Winnipeg, 3 in.; Durham, 12 in.; Wyoming, 13 in.; Thedford, 21 in.; Coldstream, 10 in.; Goderich, 3 in.; Orangeville, 5 in.; Cape Magdalen, 4 in.; Owen Sound, 9 in.; Uplands, 4 in.; Lucknow, 3 in.; Point Clark, 6 in.; Point des Monts, 12 in.; Birnam, 16 in.

12. Thedford, 3 in.; Galt, 3 in.; Saugeen, 4 in.

13. Woodstock, 4 in.; Durham, 3 in.; Haileybury, 5 in.; Princeton, 5 in.; Aurora, 3 in.; Presque Isle, 3 in.; Wiarton, 4 in.; Hartney, 3 in.; Sault Ste. Marie, 4 in.; Beatrice, 3 in.; Elora, 5 in.; Point Clark, 3 in.; Heron Bay, 3 in.; Parry Sound, 7 in.; Saugeen, 5 in.

14. Calgary, 4 in.; Mellendean, 3 in.; Dalhousie, 3 in.; Uplands, 3 in.; Burk's Falls, 3 in.

15. Pincher Creek, 4 in.; Uplands, 3 in.; Calgary, 4 in.; Quesnelle, 3 in.; Barkerville, 8 in.

16. Abbotsford, 4 in.; Mission Valley, 5 in.; Rivers Inlet, 4 in.

17. Glacier, 6 in.

18. Goderich, 3 in.; Heron Bay, 3 in.; Schreiber, 3 in.; Quesnelle, 7 in.; Glacier, 12 in.; Barker-ville, 5 in.

19. Edmonton, 4 in.; Stratford, 3 in.; Durham, 3 in.; Hillview, 6 in.; Henrietta, 4 in.; Chaplin, 5 in.; Coldstream, 5 in.; Cartwright, 4 in.; Parker's Ridge, 3 in.; Whiteside, 3 in.; Sprucedale, 3 in.; St. Mary's, 3 in.; Uplands, 4 in.; Peterborough, 3 in.; Owen Sound, 4 in.; Lucknow, 5 in.; Point Clark, 3 in.; Parry Sound, 3 in.; Saugeen, 6 in.; Donald, 4 in.; Glacier, 9 in.

20. Coldwater, 7 in.; Durham, 6 in.; Emerson, 4 in.; Midland, 5 in.; Wiarton, 4 in.; Brandon, 3 in.; Turtle Mountain, 4 in.; Morden, 3 in.; Norquay, 3 in.; Népigon, 6 in.; Whiteside, 3 in.; Bis-cotasing, 4 in.; Missanabie, 6 in.; Savanne, 6 in.; White River, 4 in.; Grindstone, 5 in.; Enderby, 4 in.; Glacier, 5 in.

21. Haileybury, 4 in.; Dalhousie, 3 in.; Biequet, 4 in.; Sprucedale, 3 in.; Schreiber, 14 in.; Grind-stone, 7 in.; Glacier, 8 in.

22. Georgina, 5 in.; Missanabie, 3 in.; Schreiber, 4 in.; Glacier, 4 in.

23. Biequet, 9 in.; Point des Monts, 9 in.; Father Point, 7 in.; Kaslo, 3 in.

24. Spence's Bridge, 8 in.; Mount Forest, 3 in.; Denbigh, 4 in.; Presque Isle, 3 in.; Foxton, 3 in.; Mattawa, 3 in.; Elora, 4 in.; Parry Sound, 4 in.; Salmon Arm, 4 in.; Goldstream Lake, 6 in.; Fort Steele, 4 in.

25. Edmonton, 4 in.; Ottawa, 3 in.; Durham, 6 in.; Oakbank, 3 in.; Pincher Creek, 4 in.; Cal-gary, 4 in.; Wallace, 6 in.; Brandon, 3 in.; Rathwell, 3 in.; Oakbank, 3 in.; Barclay, 4 in.; Calgary, 6 Yarmouth, 3 in.; Donald, 13 in.; Nicola Lake, 7 in.; Kaslo, 3 in.; Glacier, 7 in.

26. Haileybury, 4 in.; Channel Island, 4 in.; Missanabie, 4 in.; Heron Bay, 7 in.; Savanne, 5 Calgary, 4 in.; White River, 3 in.; Sydney, 3 in.; St. Johns, 3 in.

27. Spence's Bridge, 3 in.; Fredericton, 5 in.; Parker's Ridge, 6 in.; Georgetown, 3 in.; Point des Monts, 9 in.; Biequet, 6 in.; Sault Ste. Marie, 12 in.; Whiteside, 4 in.; Beatrice, 3 in.; Orillia, 3 Georgina, 4 in.; Point Escuminac, 4 in.; Point des Monts, 9 in.; Gravenhurst, 3 in.; Grand Manan, 4 in.; Quebec, 5 in.; Barkerville, 5 in.

28. London, 3 in.; Durham, 6 in.; Thompson, 5 in.; Mount Forest, 4 in.; Sunshine, 3 in.; Cold-stream, 4 in.; Grindstone, 3 in.; Glacier, 6 in.

29. Hillview, 6 in.; Pictou, 3 in.; Owen Sound, 3 in.; Grindstone, 3 in.; Glacier, 6 in.

30. Minnedosa, 4 in.; Foxton, 3 in.; Bancroft, 4 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (II'), the feeblest in brilliancy.*

1. Haileybury, III; St. Andrews, I.

2. Truro, IV; Fredericton, IV; Moose Jaw, IV; Chicoutimi, Savanne, Medicine Hat, IV; Father Point, III.

3. Alameda, IV; Channel Island, III.

4. Haileybury, III; Pembina Crossing, IV.

5. Pembina Crossing, IV.

6. Pembina Crossing, IV.

7. Haileybury, III; Gravenhurst, III

8. Deseronto, Chicoutimi.

12. Ottawa, IV.

13. Emerson, III; Pembina Crossing, III; Pictou, Georgetown.

14. Alameda, Portage la Prairie.

15. Haileybury, IV ; Moose Jaw, IV ; Hillview, III.
16. Minnedosa, IV ; Portage la Prairie, Savanne, Prince Albert, III.
17. Duck Lake, Moose Jaw, IV ; Channel Island, IV ; Pembina Crossing, IV ; Savanne, Montreal, St. Andrews, I ; Quebec, III.
18. Minnedosa, IV ; Truro, IV ; Haileybury, IV ; Moose Jaw, Hillview, II ; St. Albans, II ; Savanne, Pembina Crossing, IV ; Grand Manan, IV ; St. Andrews, IV.
19. Savanne, Gravenhurst, IV ; Quebec, IV.
20. Hillview, IV.
21. Hillview, IV.
22. Moose Jaw, IV ; Hillview, IV ; Chicoutimi, IV.
23. St. Albans, III ; Portage la Prairie, Gravenhurst, IV ; Medicine Hat, III.
24. Truro, IV ; Medicine Hat, III.
25. Alameda, IV ; Chicoutimi, IV ; Montreal, Qu'Appelle, III.
26. Moose Jaw, Hillview, IV ; St. Albans, IV ; Father Point, IV.
28. Truro, IV ; Haileybury, IV ; Savanne.
29. Fredericton, IV ; Moose Jaw, IV ; Hillview, IV ; Channel Island, IV ; Portage la Prairie, Savanne.
30. Alameda, III ; Cape Chatte.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF NOVEMBER, 1894.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON.	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....			s	0 03	0 12	0 22	0 24	0 25	0 26	0 21	0 17	0 12				
AGASSIZ, B. C. ....				s	06	12	21	22	24	23	18	09	s			
INDIAN HEAD .....				00	01	20	36	40	44	40	35	08				
BRANDON .....				s	24	38	51	54	45	41	59	28	s			
WINNIPEG .....				06	25	31	29	37	44	42	42	30	02			
WOODSTOCK .....				01	17	31	42	43	42	34	25	15	07			
TORONTO .....				05	26	37	37	41	33	25	17	13	04			
LINDSAY .....				02	07	17	31	37	24	21	17	12	06			
BARRIE .....				03	08	15	26	26	26	20	14	11	02			
KINGSTON .....			s	15	28	37	38	43	33	27	20	14	04			
MONTREAL .....				07	23	25	30	34	31	27	18	14	01			
FREDERICTON .....				08	42	45	48	49	48	42	41	33	14			
				ESQUIMAULT.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.	
MEAN PROPORTION FOR MONTH.....				0 17	0 15	0 25	0 36	0 32	0 27	0 25	0 18	0 16	0 27	0 27	0 30	
(Constant sunshine being 1.)																
MAXIMUM DAILY AMOUNT.....				0 86	0 81	0 67	0 87	0 93	0 58	0 61	0 38	0 68	0 33	1 00	0 94	
DATE .....				15	8	18	9	18	17	17	18	4	28	4	12	
NO. OF DAYS COMPLETELY CLOUDED .....				17	17	11	10	7	6	5	11	9	6	7	10	

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each evening are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 714. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	107	76	14	17	77.6
LOWER LAKE REGION.....	131	102	20	9	85.5
UPPER ST. LAWRENCE.....	120	94	18	8	85.8
LOWER ST. LAWRENCE.....	118	96	14	8	86.4
GULF.....	119	99	12	8	81.5
MARITIME PROVINCES.....	119	93	18	8	85.7
TOTAL.....	714	599	96	58	85.0

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from all observing stations are used.

The daily probabilities and storm warnings were issued by Probability Officer B. C. Webber.

#### STORM WARNINGS.

During the month warnings on the approach of nine storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 452, of which 419 were verified. At 64 stations, however, the force exceeded, and at 55 did not reach that indicated by the signals displayed; 31 stations reported warnings received late, owing to delay in issue and 15 owing to delay in transmission.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 419 warnings verified as to force 387, or 92.4 per cent. were fully verified, and 405, or 96.7 per cent. were fully and partially verified.

No. 1.—At 10 a.m. on the 2nd, all Lake Stations were warned to expect a strong gale from the E., shifting to S. and S. W., in advance of an area of low pressure which, having moved north-eastward from Texas, was then near Lake Michigan. It passed north-eastward across the Lakes, giving during the 2nd and 3rd a fresh to strong S. E. to S. W. and N. W. gale everywhere; at Goderich blowing 53 miles per hour from the S. W., 60 miles S. W. at Port Stanley, and 43 S. W. at Toronto. On the night of the 2nd, the Gulf Stations north of the Bay of Chaleur were warned, and next morning all other eastern stations were warned for a moderate gale from S. E. to S. W. As the storm passed over Eastern Canada on the 3rd, it gave a fresh to strong gale from the directions indicated, blowing 45 miles per hour from the S. E. at Point Escuminac, 42 S. at Yarmouth, 49 S. E. and S. W. at St. John, N.B., and 62 W. at Father Point. On the 4th the storm passed over Labrador.

No. 2.—All eastern stations were warned at 10 p.m. on the 5th to expect a strong gale from the E. shifting to N. and N. W. At the time there was a very important cyclone central near New York city. This moved directly up the coast on the 6th, its centre passing slightly to the east of Nova Scotia. The storm was generally reported as a heavy gale, more especially so along the Atlantic Coast, the general directions being from N. E. shifting to N. W. At Halifax the wind blew with hurricane force. The schooner "Annie M. Pride" was dashed to pieces at the mouth of the harbour, with loss of all hands. At St. John, N.B., it was a fierce storm with snow, causing a good deal of damage about town. From Annapolis reports of a fierce gale were received. From Digby reports of a terrible sea outside in the Bay of Fundy, and loss of the schooner "Annie May" and some of the hands. From Yarmouth reports of the schooner "Manitor" being ashore. At Margaretsville, N.S., the schooner "Gaza" went ashore, and at Petite de Grat the schooner "Kezia" also went ashore.

No. 3.—In advance of a developing cyclone, which was approaching the Lakes from the north-west, Lake Superior Stations were warned at 10 p.m. on the 8th, to expect a strong gale from the S. W. to N. W. At 10.40 p.m. all other lake stations were similarly warned. The cyclone moved south-eastward, being over lower Michigan on the night of the 9th, and then from there

took a north-easterly course to Labrador. It caused a moderate to fresh gale on the Lakes on the 9th and 10th, the winds veering through S. to N. W. on Lakes Erie and Ontario, and backing on the other lakes through N. to N. W. In advance of the cyclone eastward, eastern stations as far south as the Bay of Chaleur were warned at 4 p.m. on the 9th, and that night all other eastern stations were warned for a fresh to strong easterly gale. The cyclone, however, decreased in energy on reaching eastern Canada, and caused only a moderate gale there.

No. 4.—At 11 a.m. on the 12th, all Lake Stations, excepting Port Arthur, were warned for a moderate S. to W. gale in advance of a cyclone approaching the Lakes from the north-west. It crossed the Lakes on the 13th, giving a moderate to fresh S. to W. gale, reaching a velocity of 47 miles per hour at Goderich, and 40 miles at Port Stanley.

No. 5.—In advance of an important cyclone central over Manitoba on the night of the 14th, all lake stations were warned to expect a strong S. to W. gale. Next day a fresh to strong gale set in over the Lakes, blowing 53 miles per hour from the S. at Goderich, 40 S. W. at Port Stanley, 41 S. W. at Toronto, and 35 S. S. W. at Kingston. Next morning the storm was central to the north of Lake Superior, and at 11 a.m. all eastern stations were warned for a moderate S. to W. gale. The cyclone on reaching eastern Canada had diminished in energy; a moderate S. to W. gale was reported on the Bay of Fundy and the S. E. portion of the Gulf of St. Lawrence, otherwise there was no storm.

No. 6.—At night of the 17th, a small depression over the North-west States was being followed by an important anti-cyclone over the North-west Territories, accompanied by decidedly cold weather. At 10 p.m. Lake Superior Stations were warned for a strong W. to N. gale. Next morning the depression was over Lake Superior when all other lake stations were warned for a moderate S. W. to N. W. gale. During the 18th a strong W. to N. gale with snow and a change to decidedly colder weather was experienced on Lake Superior. On that and the following day the other lakes also experienced a moderate S. W. to N. W. gale and also a change to decidedly colder weather. After reaching the Lakes the steep gradients in the anti-cyclone became more uniform there, but still followed the depression over eastern Canada, there being marked differences in temperature on the eastern and western sides of the depression. All stations in the Gulf and on the Cape Breton Coast were therefore warned on the morning of the 19th for a strong W. to N. N. W. gale, and the other Maritime Stations were warned for a moderate S. W. to N. W. gale. On the 19th and 20th a strong S. W. to N. W. gale, with much colder weather, prevailed in the district warned. At Father Point a velocity of 64 miles was recorded; at Point Escuminac, 51 N. W.; at Low Point, 56 W., and at St. John, N.B., 41 N. W. SS. "State of Georgia" arrived at North Sydney in a disabled condition with loss of deck load, and reported a severe hurricane in the Gulf on the 19th and 20th from the N. W., the sea ran mountains high washing 1,380 sheep and 140 cattle overboard. SS. "Minia" reported on arriving at the same place a perfect hurricane at Placentia Bay, Newfoundland, on the 19th and 20th. Capt. Miller, of the schooner "Frank," reported from Alberton that he was preparing to leave port, but on hearing the storm signal was up at Tignish, he kept in port. He states that had it not been for the warning the schooner would in all probability have been lost with all hands.

No. 7.—At 10 p.m. on the 19th Lake Superior Stations were warned for a strong gale from the E., shifting to N. to N. W. in advance of a cyclone which was then central over Assiniboia, and next morning at 10.30 a.m. all other Lake Stations were warned for a moderate S. E. to S. W. gale. The cyclone crossed the Lakes on the 20th, and then dispersed. It caused a heavy gale on Lake Superior which was reported as blowing with hurricane force at Sault Ste. Marie on the 19th, and during the 20th and 21st there was a fresh S. E. to S. W. gale on the other lakes.

No. 8.—All eastern stations were warned at 10 a.m. on the 25th for a strong gale from the E., shifting to N. and N. W. in consequence of a depression off the Nova Scotian Coast which was showing signs of development. It moved out to sea next day after causing a moderate to fresh gale from the N. E. and N. W. over the greater portion of the district warned.

No. 9.—At 10.30 a.m. on the 26th all Lake Stations were warned in advance of a developing depression from the north-west, then nearing Lake Superior. As the depression was moving quickly eastward, stations between Father Point and Chatham, N.B., were warned for a moderate easterly gale, and at 10 p.m. all other stations in the Gulf and on the Cape Breton Coast were similarly warned. The gale was reported to have been very severe on Lake Superior on the 27th, and a strong gale was general on the other lakes from the S. W. and N. W. At 10 a.m. on the

27th the signals in eastern Canada were changed to No. 2, for a moderate westerly gale. A moderate to fresh gale first set in at most places on the 27th from the eastward, gradually veering to W. and N. W., and continuing until the night of the 29th.

# TORONTO OBSERVATORY—MAGNETIC REVIEW FOR NOVEMBER, 1894.

Mean westerly declination.....	4° 44'4
Increase from November, 1893.....	5'5
Mean absolute horizontal force.....	0'16622
Increase from November, 1893.....	'000003
Mean absolute vertical force.....	0'60252
Decrease from November, 1893.....	0'10

A slight disturbance of the declination needle was recorded during the early hours of the 1st and 2nd, and also between 6 p.m. of the 2nd and 8 a.m. of the 3rd, then again there was a small disturbance between 10 p.m. and midnight of the 6th, and also during the nights of the 7th and 8th. At 8.48 a.m. of the 13th an important disturbance set in, the declination needle then taking a rapid easterly swing of 12'; the extreme westerly reading, 38' west of the normal, occurred at 10.57 a.m., and the extreme easterly—36' east of normal—at 9.47 p.m. This disturbance was most strongly marked between 6 and 10 p.m., but at no time were there any very important changes in either horizontal or vertical force; at the commencement of the disturbance the horizontal component gradually decreased, but after 6.20 p.m. both components increased. After 8 a.m. of the 14th the magnets were quiet until 6 p.m., from which hour until midnight the declination was slightly disturbed. On the following evening it was again disturbed, and to a greater extent, as at 8 p.m. the reading was 24' east of normal.

On the 17th, 18th and 19th slow waves of disturbance were registered; the most important changes were at 7.10 p.m. of the 18th and 8.30 p.m. of the 19th, the extreme in each case being about 20' east of normal.

A steady magnet prevailed on the 21st and 22nd and up to 2 a.m. of the 23rd, after this hour a slight disturbance sprang up, but passed off by 4 p.m. of the 23rd. At 2.47 p.m. the declination reading was 30' west of normal. On the morning of the 24th, and off and on until the close of the month, slight disturbances were registered.

On the 1st, 6th, 8th, 10th, 11th, 12th, 15th, 17th, 19th, 23rd, 24th, 25th, 27th and 28th the sky was clear and no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, February, 1895.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

DECEMBER, 1894.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### ATMOSPHERIC PRESSURE.

The mean pressure for the month was above average to the greatest extent over the Maritime Provinces where it averaged  $+0.10$ . It was about the mean over Ontario. The greatest departure below average was over S.E. Manitoba, to the north of Lake Superior and over Central Alberta, where it was about  $-0.05$ . In Assiniboia it was about average.

The paths of the depressions were rather erratic in three cases and direct in four cases. The mean velocity of their travel was 34.0 miles per hour.

1st to 6th. With the exception of some light rain and snow on the 2nd caused by a moderate depression which crossed the Lakes and passed to the coast, the weather was fine everywhere. The conditions were generally anti-cyclonic until the 4th when a depression extended from the Rocky Mountains to the Gulf of St. Lawrence. This was not important, it gave a tendency for south-westerly winds and moderate temperatures every where and interfered but little with the fine weather.

6th to 10th. On the 6th an extensive depression appeared over the whole western portion of the continent. It caused some showers in Manitoba and soon spread to the Lakes where it was the cause of showery weather on the 7th and 8th and some rain or snow in the Upper St. Lawrence district. It quickly dispersed on the 9th when the anti-cyclonic conditions and fine weather, which had been prevalent over eastern Canada, spread to the Lakes.

During this period the pressure in the North-west was low, but the weather remained fine.

10th to 13th. A depression which was over Texas on the 9th moved north-eastward, reaching the Lakes on the 10th, where it brought an easterly gale and rain, which in some localities was excessive. The depression soon dispersed and next day the weather became fairer, but on the 12th a re-development took place over the Lakes and rain again set in with a westerly gale.

The storm then moved quickly eastward and a general rainfall with a gale from the south shifting to westerly prevailed throughout eastern Canada, where for several days previously the weather had been fine. The storm passed across Newfoundland on the 13th and the weather cleared up everywhere. In the North-west the weather had continued fine with moderate temperatures.

13th to 18th. An extensive anti-cyclone now spread over the continent, but quickly moved south-eastward and was succeeded by generally low pressure from the Rocky Mountains to the Atlantic. Some light local snow-falls occurred in the North-west on the 15th, otherwise the weather continued fine until the 16th, by which time the low pressure had resolved itself into an important cyclone central over Lake Superior, the weather became showery and a gale from the south and west set in. From the Lakes the cyclone moved with diminished energy north-eastward to Labrador causing some showers and a moderate to fresh westerly gale, being followed by an extensive anti-cyclone and fine weather.

18th to 22nd. Fine weather and moderate temperature were now general everywhere, but on the 20th a disturbance of some importance appeared over the North-west giving some showers with high winds and a change to decidedly colder weather. The disturbance passed across the Lakes on the 21st where it caused high winds and some showers, and thence it moved eastward the high winds reaching the force of a fresh gale in the Gulf of St. Lawrence. It passed over Newfoundland on the 22nd being followed throughout by higher pressure and decidedly colder weather.

After the 20th anti-cyclonic conditions and fine cold weather prevailed throughout the North-west.

23rd to 26th. The pressure on the 23rd was above normal throughout Canada with generally fine cold weather. A slight depression set in at night over Manitoba, and after giving a light fall of snow there quickly developed as it passed to the Lakes, where it gave a light fall of rain and snow on the 24th. It then moved eastward crossing the Gulf of St. Lawrence on the 25th. It was accompanied throughout by high winds and rain or snow. This was followed by anti-cyclonic conditions which soon extended throughout Canada.

27th to 31st. A slight disturbance which first appeared over southern Texas, had moved to the Carolina coast by night of the 26th. Next morning it had developed into a very important storm central near New York and snow had set in throughout the Lakes and eastern Canada with a strong east to north gale. By night having moved northward it was central over Maine, the fall of snow had practically ceased in Ontario, but it still snowed in Quebec and was raining in New Brunswick and Nova Scotia, the gale continuing east of Kingston. Next morning (28th) however the storm had almost entirely dispersed and the weather cleared up everywhere. Meantime in the North-west, since the 26th, the weather had been little disturbed and the pressure continued high with generally fine cold weather.

On the night of the 28th a slight disturbance appeared off the Atlantic coast and another north of Lake Superior. The former passed rapidly northeastward over the Maritimes Provinces during the 29th, giving a heavy fall of sleet or snow in Nova Scotia and high winds from the north shifting to west. The latter depression gave a moderate snowfall and strong westerly winds as it slowly passed eastward on the 29th and 30th, after which the weather, until the end of the month, was fair and cold everywhere.

#### TEMPERATURE.

The average temperature of the Month of December was above the normal, except in British Columbia.

*The Highest and Lowest Temperatures in each Province for December were :*

British Columbia,  $59^{\circ}0$  on 14th at Quamichan,  $32^{\circ}0$  on 31st at Donald.

North-west Territories,  $50^{\circ}2$  on 19th at Medicine Hat,  $-38^{\circ}9$  on 26th at Prince Albert.

Manitoba,  $44^{\circ}3$  on 20th at Minnedosa,  $-34^{\circ}0$  on 27th at Hillview.

Ontario,  $57^{\circ}0$  on 8th at Welland,  $-43^{\circ}0$  on 28th at White River.

$57^{\circ}0$  on 16th at Stoney Creek.

$57^{\circ}0$  on 18th at Collingwood.

Quebec,  $48^{\circ}3$  on 17th at Montreal,  $-29^{\circ}7$  on 29th at Richmond.

New Brunswick,  $54^{\circ}0$  on 18 at Grand Manan,  $-15^{\circ}0$  on 27th at Dalhousie.

Nova Scotia,  $55^{\circ}0$  on 13th at Pictou,  $-1^{\circ}3$  on 24th at Truro.

Prince Edward Island,  $49^{\circ}0$  on 18th at Georgetown,  $-3^{\circ}0$  on 24th at Georgetown.





PRECIPITATE TEMPERATURE WIND AND PRECIPITATION AT ALL STATIONS IN THE DOMINION OF CANADA, DECEMBER, 1894.

*ut.* Parameter not reduced to Sea Level. • Stations not furnished with Registering Thermometers.

[illegible]

Stratford.....	1191	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Baldovon.....	1192	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1193	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1194	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1195	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1196	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1197	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1198	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1199	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1200	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1201	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1202	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1203	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1204	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1205	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1206	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1207	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1208	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98	+0.73	10.17	0	0
Windsor.....	1209	39.09	30.49	29.65	0.86	27	24	5.5	48.3	16	23	25	8	0	8	4	1	9	25	2	5	93	1.98				

## PRECIPITATION.

The rainfall in Ontario, Nova Scotia, and Prince Edward Island, was above the normal amount, in the other Provinces it was below.

*The general distribution is as follows :—*

In British Columbia the rainfall was in general 2·90 in., or about 3·10 in. below the average.

In the North-west Territories, 0·03 in., the fall occurring only at a few stations.

In Manitoba the rainfall was 0·04 in., or about the average.

In Ontario, West and South-west District it was 2·26 in., or 0·19 in. above the average. In the North and North-west District it was 1·16 in., or 0·36 in. above the average. In the Central District it was 1·44 in., or 0·40 in. above the average, and in the East and North-east District it was 1·10 in., or 0·32 in. above the average.

In Quebec it was 0·33 in., or 0·62 in. below the average.

In New Brunswick it was 1·42 in., or 0·38 in. below the average.

In Nova Scotia it was 3·81 in., or 0·21 in. above the average.

In Prince Edward Island it was 4·16 in., or 2·41 in. above the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Beaver Creek, 9·78 in.; Union, 6·75 in.; Langley, 5·58 in.; New Westminster, 5·79 in.; Sproat Lake, 9·12 in.; Rivers Inlet, 5·92 in.; Loch Erroch 5·12 in.

NEWFOUNDLAND.—Channell, 5·54 in.

BERMUDA. Prospect, 5·95 in.

*Rainfall one inch and upwards in 24 hours :—*

3. Port Simpson, 1·39 in.

4. Port Simpson, 4·92 in.

5. Sproat Lake, 1·80 in.; Beaver Creek, 1·82 in.; Union, 1·26 in.

7. Bermuda, 2·05 in.

8. Sarnia, 1·08 in.; St. George, 1·30 in.

10. Abbotsford, 1·10 in.; Beaver Creek, 1·33 in.; Kuper Island, 1·02 in.

11. Brantford, 1·33 in.; Elora, 1·17 in.; Canobie, 1·05 in.; Loch Erroch, 1·46 in.; Beaver Creek, 1·44 in.; Goldstream Lake, 1·05 in.; Langley, 1·50 in.; Port Dover, 1·07 in.

12. Digby, 1·35 in.; Blenheim, 1·14 in.; Ennismore, 1·70 in.; Burk's Falls, 1·12 in.; Princeton, 1·25 in.; Bloomingdale, 1·61 in.; Huntsville, 1·10 in.; Orillia, 1·34 in.; Bognor, 1·06 in.; Virgil, 1·00 in.; Rivers Inlet, 2·52 in.; Coldwater, 1·15 in.; Port Stanley, 1·08 in.

13. Channell, 1·25 in.; Whiteside, 1·26 in.; Beatrice, 1·20 in.; Beaver Creek, 1·34 in.; Union, 3·44 in.; Charlottetown, 1·13 in.

14. Sproat Lake, 1·35 in.; Bermuda, 1·21 in.

16. Georgina, 1·12 in.

18. Port Simpson, 1·55 in.

21. Sproat Lake, 1·30 in.

22. Sproat Lake, 2·30 in.

27. Point Lepreaux, 1·10 in.; Yarmouth, 1·20 in.

28. Channell, 1·00 in.; Georgetown, 1·00 in.; Truro, 1·56 in.; Charlottetown, 1·14 in.; Halifax, 1·24 in.

29. Pictou, 2·00 in.; Channell, 1·07 in.; Port Hastings, 1·05 in.; Georgetown, 2·45 in.; Sydney, 1·59 in.

30. Channell, 1·92 in.

## SNOWFALL.

The snowfall throughout the Dominion except at some few stations has been very small a marked contrast with December, 1893.

BRITISH COLUMBIA. Snow fell in the Province as a whole to a depth of about 9·6 in.

In the NORTH-WEST TERRITORIES 5 in. has fallen, about 3 in. less than in December, 1893.

In MANITOBA 3 in. has fallen, or about 5 in. below the average.

In ONTARIO in the same districts as in the rainfall 2·9 in., or 12·3 in. below the average; 10·2 in., or 14·8 in. below the average; 1·3 in., or 10·3 in. below the average; 9·0 in., or 19·8 in. below the average.

In QUEBEC 19·3 in., or 2 in. below the average.

IN NEW BRUNSWICK 9'4 in., or 9'8 in. below the average.

IN NOVA SCOTIA 2'6 in., or 17'6 in. below the average.

IN PRINCE EDWARD ISLAND 2'9 in., or 17'1 in. below the average.

*Monthly snowfall 12 in. and upwards.*

BRITISH COLUMBIA.—Spence's Bridge, 12 in.; Glacier, 104 in.; Barkerville, 18 in.; Stuart's Lake, 13 in.; Pilot Bay, 26 in.; Kaslo, 20 in.; Goldstream Lake, 14 in.; Union, 51 in.

ONTARIO.—Parry Sound, 16 in.; White River, 12 in.; Rockcliffe, 23 in.; Orillia, 17 in.; Uplands, 16 in.; Spence, 14 in.; Owen Sound, 12 in.; Durham, 12 in.; Haileybury, 15 in.

QUEBEC.—Father Point, 20 in.; Quebec, 21 in.; Cape Magdalen, 21 in.; St. Hyacinthe, 23 in.; Montreal, 23 in.; Richmond, 21 in.; Brome, 13 in.; Points des Monts, 23 in.

NEW BRUNSWICK.—St. Andrews, 12 in.

PRINCE EDWARD ISLAND.—Charlottetown, 15 in.

*Snow, 4 inches and upwards in 24 hours.*

3. Quesnelle, 5 in.; Halifax, 4 in.

5. Glacier, 4 in.

6. Barclay, 4 in.; Barkerville, 4 in.; Goldstream Lake, 4 in.; Union, 8 in.

7. Goldstream Lake, 8 in.; Union, 8 in.

8. Goldstream Lake, 4 in.; Union, 16 in.; St. John, 6 in.; Haileybury 4 in.

9. Sault St. Marie 4 in.; Mattawa, 8 in.; Elora, 4 in.; Richmond, 6 in.; St. Hyacinthe, 9 in.; Canobie, 6 in.; Kuper Island, 1'02 in.; Union, 4 in.; Rockcliffe, 8 in.; Haileybury, 5 in.

10. New Westminster, 1'30 in.; Union, 4 in.;

11. Missanabie, 6 in.; Barkerville, 4 in.;

12. Rockcliffe, 4 in.

13. Barkerville, 6 in.; Rivers Inlet, 8 in.

14. Barkerville, 4 in.; Glacier, 5 in.; Port Simpson, 7 in.; Emerson, III.

15. Henrietta, 5 in.; Duck Lake, 4 in.; Union, 4 in.; New Westminster, 4 in.

16. Savanne, 6 in.; Sproat Lake, 4 in.

17. Pilot Bay, 4 in.

18. Pilot Bay, 3 in.

19. Kaslo, 6 in.; Pilot Bay, 10 in.; Port Simpson, 6 in.

20. Pincher Creek, 4 in.; Glacier, 5 in.

21. Barclay, 4 in.

23. Alameda, 5 in.; Glacier, 5 in.

24. Pincher Creek, 4 in.

25. Georgetown, 4 in.; Sault St. Marie, 4 in.; Orilla, 4 in.; Parker's Ridge 5 in.

27. Pelee Island, 12 in.; Wiarton, 6 in.; Oliver's Ferry, 4 in.; Point des Monts, 18 in.; Brome, 6 in.; Richmond, 10 in.; St. Hyacinthe, 12 in.; Point Lepreaux 4 in.; Chicoutimi, 8 in.; Welland, 5 in.; Thorold, 8 in.; Lindsay, 4 in.; Deseronto, 4 in.; Ottawa, 6 in.; Chatham, 7 in.; Grand Manan, 4 in.; Quebec, 8 in.; Father Point, 9 in.; Montreal, 11 in.

28. Presqu'Isle, 4 in.; Cape Magdalene, 12 in.; Goderich, 5 in.; Dalhousie, 4 in.

29. Burk's Falls, 4 in.; Point Clark, 4 in.; Point Escuminae, 4 in.; Welland, 8 in.; Parry Sound, 6 in.; Saugeen, 4 in.; St. Andrews, 5 in.

30. Sprucedale, 4 in.; Millbrook, 4 in.; Orillia, 8 in.; Whiteside, 5 in.; Wiarton, 10 in.; Spence, 7 in.; Owen Sound, 5 in.; Midland, 6 in.; Coldwater 7 in.; Fredericton, 4 in.

31. Whiteside, 4 in.; Presqu'Isle, (30-31) 16 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Channel Island, IV ; Banff IV.

2. Portage la Prairie, Channel Island, IV ; Savanne.

3. Portage la Prairie, Moose Jaw, IV ; Channel Island, IV ; Savanne.

4. Moose Jaw, IV ; Channel Island, IV ; Savanne, Edmonton, III.

5. Pembina Crossing, IV ; Savanne, Truro, IV.

6. Richmond, II ; Pembina Crossing, III ; Georgetown, Quebec, III ; Minnedosa, III ; Hailybury, IV.

7. Edmonton, IV.

13. Edmonton, IV.

14. Savanne.

15. Henrietta, I.

17. Savanne.

18. Portage la Prairie.

19. Savanne.

21. Channel Island, IV ; Pembina Crossing, IV ; Savanne, Minnedosa, IV.

22. Chicoutimi, III ; Portage la Prairie, Pembina Crossing, IV ; Savanne, Truro, Quebec, IV ; Minnedosa, IV.

23. Portage la Prairie.

24. Portage la Prairie.

25. Henrietta, I ; Savanne.

27. Alameda, IV ; Savanne.

29. Moose Jaw, III.

30. Alameda, IV.

31. St. Albans, II ; Portage la Prairie.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF DECEMBER, 1894.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....					0 69	0 54	0 41	0 43	0 47	0 42	0 38	0 12				
AGASSIZ, B. C. ....					8	29	43	45	42	38	36	54				
INDIAN HEAD.....					12	37	43	47	52	58	49	23				
BRANDON.....					62	18	27	46	46	39	13					
WINNIPEG.....					15	29	39	45	41	45	36	66				
WOODSTOCK .....					65	27	32	39	36	34	34	33	08			
TORONTO.....				03	19	27	39	35	34	36	34	30	8			
LINDSAY.....				8	10	16	19	22	24	25	20	12	03			
BARRE.....					11	23	25	27	27	34	27	14				
KINGSTON .....					10	14	24	27	35	34	37	41	23	8		
MONTREAL.....					13	29	36	45	42	41	37	12	61			
FREDERICTON .....					24	35	36	49	52	51	45	3	8			
					ESQUIMAULT.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH.....					0 23	0 29	0 39	0 24	0 23	0 27	0 28	0 17	0 21	0 27	0 34	0 37
<i>(Central position of L.)</i>																
MAXIMUM DAILY AMOUNT .....					0 84	0 72	0 57	0 71	0 80	0 83	0 95	0 80	0 84	0 92	0 97	0 92
DATE .....					29	29	3	4	25	22	23	22	15	22	23	26
NO. OF DAYS COMPLETELY CLOUDED .....					12	12	8	14	13	14	12	17	12	12	13	10

## PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 619. These were divided as follows :—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	89	58	16	15	74.2
LOWER LAKE REGION.....	116	90	19	7	85.8
UPPER ST. LAWRENCE.....	103	82	14	7	86.4
LOWER ST. LAWRENCE.....	104	83	9	12	84.1
GULF.....	97	68	12	17	76.3
MARITIME PROVINCES.....	110	75	13	22	74.1
TOTAL.....	619	456	83	80	80.4

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions, the reports from all observing stations in Canada are used.

The daily probabilities were issued by Probability Officer H. V. Payne.

## STORM WARNINGS.

During the month warnings on the approach of six storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 125, of which 106 were verified. At 9 stations the force exceeded that indicated by the signal displayed. Two stations reported late warnings, 1 owing to issue and the other to delay in transmission.

In connection with the warnings, predictions as to probable directions of the wind were given and of the 106 warnings verified as to force 81 were fully verified, and 106 fully and partly verified.

1. At 4 p.m. on the 2nd Gulf and Ocean stations were warned for a moderate easterly gale, as a depression was then passing eastward from the Lake Region with its energy increasing. On the early morning of the 3rd a gale from the east and north-east is reported to have occurred along the Nova Scotian Coast and more specially over Cape Breton, but it apparently did not extend to the Gulf. Signals were lowered at 11.15 a.m. on the 3rd.

2. At 10.30 a.m. on the 10th, signals for a fresh to heavy gale from the S.E. through N. to N.W. were hoisted at all Lake stations still open to navigation, on account of the approach of a rather important disturbance from the South-west States. During the same night an easterly gale prevailed generally over the Lakes, and in many places it was reported to have been fresh or heavy. Signals were lowered at 10.30 a.m. on the 11th.

3. At 4 p.m. on the 12th Gulf of St. Lawrence and Ocean stations were warned for a moderate southerly to westerly gale, owing to the advance of a depression from the westward. Afterwards as it passed over the districts warned a number of the agents reported that a moderate gale from the directions given was experienced. Signals were lowered at 10.10 a.m. on the 14th.

4. Gulf and ocean stations were warned at 3.55 p.m. on the 24th, for a moderate S. to W. gale owing to the advance of a depression from the westward. All stations reported that a storm prevailed from the directions given on the 25th and a number of places, that the winds increased to the force of a fresh or heavy gale, signals were lowered at 10.50 p.m. on the 25th.

5. Cautionary cones for a moderate East. North and North-west storm were dispatched to Gulf and Ocean stations at 10.20 p.m. on the 26th a depression being then situated over the Carolinas with its energy at the same time increasing. By the following morning it had become very important and at 10.10 a.m. storm signals for a heavy gale were substituted for the cones. On the 27th a very heavy easterly gale prevailed throughout the Maritime Provinces attended by snow and rain, but apparently no shipping casualties occurred. Signals were lowered at 10.20 a.m. on the 28th.

6. Gulf and ocean stations were warned at 11 p.m. on the 31st, for a moderate easterly gale a depression was apparently approaching from the Atlantic. On the 1st, the depression passed northeastward and skirted the Cape Breton coast and Halifax, Ingonish, Cheticamp and Port Hood report that a storm occurred. Signals were lowered at 10.35 p.m. on the 1st.

# TORONTO OBSERVATORY—MAGNETIC REVIEW FOR DECEMBER, 1894.

Mean westerly declination.....	4° 44'8
Increase from December, 1893.....	5'5
Mean horizontal force.....	0'16634
Increase from December, 1893.....	'00005
Mean vertical force.....	0'60341
Decrease from December, 1893.....	0'00031

A slight disturbance of the declination needle was registered on the 1st and again on the morning of the 2nd. A quiet period then followed until 6 a.m. of the 5th, when very small changes began and lasted up to 7 p.m. Small changes occurred at intervals after 4 a.m. of the 6th, shortly after 6 p.m. of the 6th there was a westerly change in declination of 21'5 during an interval of 12 minutes while the force magnets showed no disturbance. After this there were no changes of importance registered until 5 a.m. of the 13th when the declination needle moved gradually westward, the reading at 6 a.m. being 15' west of normal; a slight decrease of both components occurred at the same time. Small disturbances were registered on both 15th and 16th; at 1.36 a.m. of the 15th the declination magnet was 16' west of its normal position, between 0.2 and 1 a.m. of the 16th the force magnets were slightly disturbed and on the same day the declination needle was at 1.10 a.m., 10'5 east of normal and at 7.19 a.m., 13' west of normal. After 8 a.m. the magnets quieted down and continued steady up to 6 a.m. of the 21st, when a slight disturbance appeared and continued until noon of the 24th with the exception of a quiet interval between 7. a.m. and 8 p.m. of the 23rd. During the remainder of the month the magnets continued comparatively steady with the exception of slight changes on the nights of the 29th and 30th.

Auroral light was observed on the evening of the 15th. On the 3rd, 4th, 5th, 14th, 17th, 19th, 20th, 22nd, 23rd, 25th, 27th and 28th the sky was clear but no aurora was observed, on all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, March, 1895.



## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

JANUARY, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL WEATHER SYNOPSIS FOR JANUARY 1895.

Twelve low pressure areas were sufficiently well marked to be traced and their mean rate of travel was 33·7 miles an hour; three of the number travelled from the neighbourhood of the Gulf of Mexico, two from the Atlantic, and the remainder from the North-west and the West.

The low area which moved northward from the West Florida Coast on the 9th had a most unusual and erratic course after reaching the Georgian Bay District, as it then apparently backed into Michigan and moved south-east to the middle Atlantic States and eventually passed north-eastward over the St. Lawrence Valley.

On the 1st a disturbance of importance from the Atlantic skirted the Cape Breton Coast and caused a fresh west to north-west gale over the Maritime Provinces accompanied by heavy rain and snow; elsewhere in Canada however the pressure was as a rule high and the weather fair.

A shallow depression which gave a moderate snowfall in Ontario on the 3rd developed much more energy when over the Maritime Provinces on the 4th, snow fell heavily, especially in portions of Nova Scotia, and the winds increased to gales from the north and west throughout the Gulf and the Maritime Provinces.

Low pressure from the North Pacific spread over the North-west Territories and Manitoba on the 5th and during this and the following day a fall of snow was very generally experienced, the greatest fall apparently occurring in Manitoba. By the night of the 5th the low pressure had extended its influence to the Lower Lakes causing snow to set in over Ontario attended by high easterly winds; the snow extended very quickly as far as our Atlantic Coast and on the 6th it turned to rain in many portions of the Lower Lake Region as well as in the Maritime Provinces.

The 7th continued unsettled from the lakes to the Atlantic with light falls of rain and snow; at the same time, however, there moved into the North-west Territories an anticyclonic system of great energy accompanied by intensely cold weather, the temperature falling to  $30^{\circ}$  and in many places to more than  $40^{\circ}$  below zero.

The high pressure spread throughout Canada on the 8th, but the cold attending it, from the lakes to the Atlantic, was in a much more modified form than elsewhere.

The next feature of importance was the erratic movement of the disturbance which travelled northward from the Gulf of Mexico on the 9th and which has been already referred to. The weather during the several days it made its presence felt was very unsettled from the lakes to the Atlantic, snow and rain fell frequently and heavily in the lower Lake Region and the Maritime Provinces; there was also snow in the St. Lawrence Valley, and on the 10th and again on the 13th strong winds and gales were experienced in all districts. During this interval the pressure was on the whole very high in the North-west accompanied by some decidedly cold weather.

A depression which crossed the Rockies from the Pacific and which was at first of considerable importance, brought a fall of snow pretty generally over the North-west Territories and Manitoba

between the 13th and 15th, the greatest amount apparently falling over the North Saskatchewan Valley. It afterwards traversed the country to the Gulf of St. Lawrence, its energy at the same time becoming less, it however, caused a light snowfall in many portions of Ontario on the 15th and subsequently a little light snow in the St. Lawrence Valley, and a more general and heavier fall of snow and rain in the Maritime Provinces.

From the 18th until the 27th the distribution of pressure in the North-west Territories and Manitoba was entirely anticyclonic, and as a rule very pronounced, and the weather was for the most part decidedly cold, and on the whole very fine; on the 20th however, a fall of snow occurred over portions of Manitoba and on one or two other occasions a few light scattered snowfalls were recorded.

During this protracted period from the Lakes to the Atlantic, on the other hand, it was frequently very stormy and some heavy falls of snow occurred turning in some places to rain. A fall of snow, which was exceptionally heavy in the vicinity of Toronto, occurred over the greater portion of the Lower Lake Region on the 18th during the rapid travel of a disturbance from the Western States to the Middle Atlantic Coast. This fall of snow was entirely confined to the Lower Lake Region and did not extend as far north as Muskoka.

A depression which was in the Western States on the morning of the 20th travelled to the Upper Lakes developing great energy, the barometer reduced to sea-level reaching 28.80 inches over the Straits of Mackinaw on the evening of the 21st, afterwards it moved slowly to the Gulf of St. Lawrence, gradually filling up. The effect of this important disturbance was unsettled weather from the Lakes to the Atlantic between the 20th and 24th, with frequent falls of snow and rain together with strong winds and gales, the latter being more severely felt in the Lake Region than elsewhere.

A disturbance which formed in the neighbourhood of Texas on the 24th, gave perhaps the most widespread bad weather of the month. It developed great energy as it passed rapidly up the Mississippi to the Lakes, and between the 25th and 27th it caused strong gales in all districts accompanied by a very heavy snowfall in Ontario, a lesser fall in Quebec and New Brunswick, and by heavy rain and snow, chiefly rain, in Nova Scotia.

A shallow depression brought a general light snowfall in the North-west on the 28th, and on the 29th snow fell over the Lower Lake Region, but as a rule in small quantities only. On the 30th also, there were light falls of snow in Quebec and the Maritime Provinces, but they were not by any means general.

On the night of the 31st, another little shallow depression, caused light local snow in northern Ontario.

#### TEMPERATURE.

The temperature westward from Manitoba was below the average, the greatest depression from 5° to 8° being in part of the North-West Territories; in the Western part of Ontario it was in general 2° to 3° above; in Quebec it was 2° to 5° above, the same excess occurring over the Maritime Provinces.

*The Highest and Lowest Temperatures in each Province during January were :*

British Columbia, 58°0 on 12th at Hazelmere, —35°0 on 3rd at Stuart's Lake.

North-West Territories, 51°0 on 12th at Calgary, —46°9 on 11th at Prince Albert.

Manitoba, 30°5 on 11th at St. Albans, —43°0 on 30th at Oakbank.

Ontario, 19°0 on 21st at Stony Creek, —48°5 on 4th at White River.

Quebec, 13°0 on 13th at Brome, —30°0 on 5th at Brome.

New Brunswick, 49°7 on 11th at Grand Manan, —48°0 on 6th at Bathurst.

Nova Scotia, 50°5 on 2nd at Sydney, —40°5 on 6th at New Glasgow.

Prince Edward Island, 48°0 on 12th at Georgetown, —7° on 6th at Charlottetown.







## PRECIPITATION.

The rainfall with the exception of Nova Scotia and British Columbia has been below the average.

*The general distribution is as follows :—*

In British Columbia the rainfall varied from 12 in. to 5 in. on the coast ; in many stations in the interior none fell.

In the North west Territories rain is reported at one or two stations but only to a small amount.

In Manitoba none has been recorded.

In Ontario West and South-west District, it was 0·60 in., or 0·66 in. below the average. In the North and North-west District, it was 0·31 in., or 0·41 in. below the average. In the Central District, it was 1·34 in., or 0·19 in. above the average ; and in the East and North-east District it was 0·52 or 0·28 in. below the average.

In Quebec it was 0·20 in., or 0·33 in. below the average.

In New Brunswick it was 1·70 in., or 0·04 in. below the average.

In Nova Scotia it was 2·38 in., or 0·94 in. above the average.

In Prince Edward Island it was 0·48 in., or 0·74 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA, Canobie, 6·71 in. ; Loch Errach, 6·62 in. ; Kuper Island 5·94 in. ; Langley, 5·67 in. ; Alberni, 11·76 in. ; Abbotsford, 5·49 in. ; Rivers Inlet, 7·47 in. ; Beaver Creek, 9·87 in. ; Duncan's Station, 6·53 in. ; Union, 5·56 in. ; Goldstream Lake, 9·82 in. ; New Westminster, 5·76 in. ; Salt Spring Island, 6·11 in. ; Hazlemere, 5·28 in. ; Fort Simpson, 5·60 in.

NOVA SCOTIA, Halifax 7·33.

*Rainfall one inch and upwards in 24 hours :—*

1. Pictou, 1·20 in. ; Channell, 1·70 in. ; Halifax, 1·83 in.

7. Halifax, 1·21 in. ; Sable Island, 1·11 in.

8. Beaver Creek, 1·30 in. ; Rivers Inlet, 1·25 in. ; Abbotsford, 1·60 in. ; Sproat Lake, 1·35 in.

9. Goldstream Lake, 1·18 in. ; Canobie, 2·37 in. ; French Creek, 1·59 in. ; Agassiz 1·02 in. ; Abbotsford, 2·00 in. ; Langley, 1·41 in. ; Loch Erroch, 1·60 in.

10. Stony Creek, 1·49 in. ; Hazlemere, 2·30 in. ; New Westminster, 1·50 in. ; Salt Spring Island, 2·46 in. ; Goldstream Lake, 2·27 in. ; Union, 1·30 in. ; Quamichan, 2·35 in. ; Beaver Creek, 3·25 in. ; Rivers Inlet, 2·03 in. ; Canobie, 1·58 in. ; Agassiz, 1·42 in. ; Alberni, 2·80 in. ; Langley, 2·20 in. ; Pilot Bay, 1·40 in. ; Loch Erroch, 2·39 in. ; Esquimalt, 1·28 in. ; Port Simpson, 1·75 in. ; Kuper Island 2·24 in. ; London, 1·66 in.

11. Goldstream Lake, 1·08 in. ; Union, 1·41 in. ; Quamichan, 1·35 in. ; Beaver Creek, 3·25 in. ; Rivers Inlet, 1·56 in. ; Alberni 4·10 in. ; Quamichan, 1·60 in.

12. Union, 1·06 in. ; Quamichan, 1·38 in. ; Beaver Creek, 1·40 in. ; Rivers Inlet, 1·30 in. ; Canobie, 1·24 in. ; Agassiz 1·03 in. ; Alberni, 2·60 in. ; Port Simpson, 1·30 in.

17. Whitehead, 1·17 in.

21. Bancroft 1·00 in. ; Point Clark, 1·37 in. ; Lucknow, 1·25 in. ; Goderich, 1·40 in. ; Presque Isle, 1·00 in. ; Bloomingdale, 1·93 in. ; London, 1·72 in.

22. Point Lepreau 1·74 in. ; Grand Manan, 1·40.

31. Port Simpson, 1·17 in.

## SNOWFALL.

The snowfall has been in excess of the average except in Quebec and New Brunswick : at some station the fall has been extremely large, due to three heavy falls on the 13th, 18th and 26th.

BRITISH COLUMBIA. Snow has generally been in excess of the usual quantity. At some parts in the eastern district upwards of six feet has been recorded.

N. W. TERRITORIES. About 9 in. has fallen, about 2 in. more than in January, 1894.

MANITOBA. 21 in. has fallen, 9 in. above that of January, 1894.

In the same DISTRICTS OF ONTARIO, as shown in the rainfall, the amount is 26·6 in. or 9·9 in. above the average ; 10·9 in. or 15·3 in. above the average ; 28·2 in. or 12·8 in. above the average ; 20·5 in. or 10·1 in. above the average.

In QUEBEC, 20·5 in., or 6·6 in. below the average.

In NEW BRUNSWICK 24·1 in., or 0·1 in. below the average.

IN NOVA SCOTIA 19'0 in., or 0'2 in. above the average.

IN PRINCE EDWARD ISLAND 27'3 in., or 0'1 in. above the average.

*Snowfall, 15 inches and upwards during month.*

B. COLUMBIA.—Griffin Lake, 25 in.; Salt Spring Island, 17 in.; Goldstream Lake, 33 in.; Union, 41 in.; Duncan's Station, 33 in.; Glacier, 45 in.; Beaver Bank, 19 in.; French Creek, 21 in.; Agassiz, 25 in.; Alberni, 42 in.; Barkerville, 29 in.; Salmon Arm, 15 in.; Quamichan, 39 in.; Kuper Island, 31 in.; Pilot Bay, 79 in.

N.-W. TERRITORIES.—Duck Lake, 15 in.; Prince Albert, 17 in.

MANITOBA.—Oakbank, 17 in.; Melledean, 16 in.; Winnipeg, 15 in.

ONTARIO.—Princeton, 31 in.; Wyoming, 18 in.; Cowal, 15 in.; Orangeville, 48 in.; Sunshine, 37 in.; Deer Park, 30 in.; Toronto, 36 in.; Waterford, 30 in.; Scarborough, 27 in.; Olivers Ferry, 34 in.; Aurora, 36 in.; Sarnia, 20 in.; Denbigh, 35 in.; Blenheim, 23 in.; Wiarton, 65 in.; Goderich, 30 in.; Midland, 53 in.; Georgetown, 37 in.; Ennismore, 19 in.; Presque Isle, 82 in.; Huntsville, 44 in.; Mount Forest, 42 in.; Coldstream, 26 in.; Thompson, 15 in.; Bancroft, 48 in.; Alton, 24 in.; Stony Creek, 20 in.; Chatnam, 19 in.; Paris, 26 in.; Point Clark, 56 in.; St. George, 38 in.; Whiteside, 65 in.; Bognor, 69 in.; Georgina, 30 in.; Uplands, 54 in.; Sault St. Marie, 16 in.; St. Mary's, 31 in.; Lakefield, 21 in.; Lucknow, 48 in.; Niagara, 26 in.; DeCewsville, 26 in.; Mattawa, 29 in.; Galt, 33 in.; Thorold, 17 in.; Elora, 32 in.; Clontarf, 28 in.; Conestogo, 27 in.; Sprucedale, 38 in.; Birman, 27 in.; North Bruce, 42 in.; Beatrice, 55 in.; Spence, 45 in.; Gravenhurst, 44 in.; Burk's Falls, 37 in.; Cottam, 16 in.; Owen Sound, 88 in.; Orillia, 36 in.; Brantford, 28 in.; Trenton, 28 in.; Cartier, 20 in.; Biscotasing, 24 in.; Missanabie, 25 in.; Heron Bay, 42 in.; Schreiber, 29 in.; Welland, 38 in.; Haliburton, 24 in.; Port Dover, 38 in.; Port Stanley, 31 in.; Saugeen, 68 in.; Parry Sound, 78 in.; Rockliffe, 32 in.; White River, 30 in.; Kingston, 25 in.; Coldwater, 46 in.; Lindsay, 38 in.; London, 20 in.; Haileybury, 25 in.; Stratford, 48 in.; Durham, 57 in.; Woodstock, 32 in.; Ottawa, 38 in.; Barrie, 73 in.

QUEBEC.—Father Point, 25 in.; Richmond, 24 in.; Cape Magdalen, 19 in.; Point des Monts, 35 in.; Montreal, 25 in.

NEW BRUNSWICK.—Chatham, 26 in.; Grand Manan, 21 in.; St. Andrews, 27 in.; Fredericton, 25 in.; St. John, 19 in.; Point Escuminac, 25 in.; Parker's Ridge, 32 in.; Point Lepreaux, 21 in.; Dalhousie, 21 in.

NOVA SCOTIA.—New Glasgow, 21 in.; Digby, 16 in.; Pictou, 35 in.; Halifax, 28 in.; Sydney, 17 in.; Yarmouth, 22 in.; Truro, 28 in.

NEWFOUNDLAND.—St. Johns, 30 in.; Channell, 21 in.

*Snowfall 4 in. and upwards in 24 hours.*

1. Wiarton, 4 in.; Presque Isle, 4 in.; Point Escuminac, 4 in.; Schreiber, 6 in.; Truro, 4 in.; Kuper Island, 4 in.; Georgetown, 5 in.; Digby, 6 in.; Pictou, 6 in.; Sprucedale, 4 in.; Spence, 4 in.; Yarmouth, 5 in.; Charlottetown, 4 in.; Chatham, 4 in.; St. John, 5 in.; Coldwater, 4 in.; Barrie, 10 in.

2. French Creek, 5 in.; Missanabie, 5 in.; Heron Bay, 20 in.; Georgetown, 6 in.; Pictou, 4 in.

3. Waterford, 4 in.; Wiarton, 5 in.; Pilot Bay, 5 in.; Kuper Island, 13 in.; Quamichan, 18 in.; Salmon Arm, 4 in.; Sproats Lake, 7 in.; Abbotsford, 4 in.; Agassiz, 4 in.; French Creek, 8 in.; Duncan's Station, 6 in.; Union, 12 in.; Goldstream Lake, 22 in.; Salt Spring Island, 11 in.; New Westminster, 4 in.; Griffin Lake, 4 in.; Spence, 4 in.; Esquimalt, 23 in.; Parry Sound, 6 in.; Durham, 6 in.

4. Princeton, 4 in.; Huntsville, 4 in.; Pilot Bay, 27 in.; Fort Steele, 5 in.; Kuper Island, 8 in.; Quamichan, 10 in.; Quesnelle, 7 in.; Barkerville, 6 in.; Sproat Lake, 4 in.; Beaver Creek, 13 in.; Glacier, 6 in.; Duncan's Station, 12 in.; Union, 4 in.; Goldstream Lake, 22 in.; Salt Spring Island, 5 in.; Georgetown, 4 in.; St. Mary's, 5 in.; Point des Monts, 4 in.; New Glasgow, 6 in.; Digby, 4 in.; Pictou, 10 in.; Owen Sound, 6 in.; Halifax, 12 in.; Charlottetown, 7 in.; Truro, 9 in.; Pilot Bay, 27 in.; Barrie, 7 in.

5. Hillview, 4 in.; Rapid City, 6 in.; Denbigh, 5 in.; Midland, 4 in.; Presque Isle, 4 in.; Pilot Bay, 39 in.; Barkerville, 8 in.; French Creek, 4 in.; Glacier, 5 in.; Goldstream Lake, 6 in.; Dalhousie, 7 in.; Oakbank, 4 in.; Beatrice, 4 in.

6. Oliver's Ferry, 4 in.; Schreiber, 8 in.; Agassiz, 10 in.; Barclay, 4 in.; Parker's Ridge, 6 in.; Thompson, 4 in.; St. Hyacinthe, 4 in.; Richmond, 6 in.; Point Lepreaux, 7 in.; Whitehead, 4 in.; Pictou, 4 in.; Yarmouth, 4 in.; St. Andrews, 5 in.; Parry Sound, 4 in.; Bathurst, 6 in.; Deseronto, 5 in.; Montreal, 4 in.

7. Huntsville, 5 in.; Sproat Lake, 15 in.; Port Simpson, 6 in.; Sydney, 5 in.; St. John, 4 in.; Fredericton, 6 in.

8. Quamichan, 4 in.; Quesnelle, 5 in.; Barkerville, 7 in.; Sproat Lake, 9 in.; Union, 4 in.; Stuart's Lake, 6 in.; Durham, 6 in.

9. Goderich, 4 in.; Glacier, 7 in.

10. Scarborough, 5 in.; Denbigh, 6 in.; Wiarton, 15 in.; Presque Isle, 12 in.; Chilcotin, 6 in.; Glacier, 7 in.; Griffin Lake, 12 in.; Cottam, 5 in.; Orillia, 4 in.; Saugeen, 4 in.; Coldwater, 7 in.; Lindsay, 4 in.; Stratford, 4 in.; Durham, 6 in.; Barrie, 7 in.

11. Princeton, 5 in.; Orangeville, 12 in.; Oliver's Ferry, 4 in.; Sarnia, 8 in.; Ennismore, 4 in.; Point Escuminac, 4 in.; Barclay, 4 in.; Cartier, 12 in.; Point des Monts, 18 in.; Cape Magdalen, 5 in.; Dalhousie, 6 in.; Sprucedale, 5 in.; Beatrice, 5 in.; North Bruce, 5 in.; Spence, 7 in.; Burk's Falls, 6 in.; Elora, 5 in.; Owen Sound, 8 in.; Paris, 4 in.; St. Andrews, 5 in.; Quebec, 5 in.; Parry Sound, 5 in.; Bathurst, 6 in.; Haileybury, 5 in.; Ottawa, 7 in.

12. Waterford, 12 in.

13. Princeton, 6 in.; Thedford, 6 in.; Wyoming, 4 in.; Scarborough, 4 in.; Oliver's Ferry, 6 in.; Presque Isle, 5 in.; Sarnia, 4 in.; Denbigh, 5 in.; Goderich, 4 in.; Midland, 4 in.; Port Dover, 7 in.; Port Stanley, 6 in.; Parry Sound, 7 in.; Coldwater, 5 in.; Deseronto, 4 in.; Stratford 7 in., Durham, 4 in.; Woodstock, 6 in.; Brantford, 8 in.; Welland, 18 in.; Ottawa, 8 in.; Toronto, 5 in.; Georgetown, 5 in.; Coldstream, 8 in.; Rivers Inlet, 6 in.; Clontarf, 8 in.; Birnam, 5 in.; Spence, 4 in.; Burks' Falls, 4 in.; Cottam, 4 in.; Barrie, 6 in.

14. Orangeville, 6 in.; Deer Park, 6 in.; Presque Isle, 4 in.; Mount Forest 4 in.; Union, 10 in.; Pincher Creek, 4 in.; Cape Magdalen, 4 in.; Beatrice, 6 in.; Paris 4 in.; Saugeen 7 in.; Calgary 5 in.; Durham, 7 in.; Welland, 10 in.

15. Union, 5 in.; Georgetown, 4 in.; Parker's Ridge, 4 in.; Pictou, 6 in.; Sprucedale, 5 in.; Thorold, 4 in.; Spence, 6 in.; Elora, 5 in.; Sydney, 4 in.; Port Dover, 4 in.; Parry Sound, 7 in.; Prince Albert, 10 in.

16. Midland, 4 in.; Channell, 9 in.; Parry Sound, 5 in.

17. Wiarton 4 in.; Cartier, 5 in.; Georgetown, 5 in.; St. Johns, 4 in.; Saugeen, 4 in.; Medicine Hat, 4 in.; Truro, 4 in.; Durham, 4 in.

18. Deer Park, 8 in.; Waterford, 5 in.; Scarborough, 7 in.; Presque Isle, 7 in.; Goderich, 6 in.; Georgetown, 9 in.; Mount Forest, 4 in.; Conestogo, 5 in.; North Bruce, 5 in.; Saugeen, 4 in.; Stratford, 5 in.; Welland, 4 in.; Toronto, 11 in.; Barrie, 8 in.

19. Princeton, 5 in.; Orangeville, 15 in.; Sunshine, 5 in.; Mount Forest, 4 in.; Langley, 4 in.; New-Westminster, 4 in.; Hazlemere, 4 in.; Thorold, 5 in.

20. Morden, 6 in.; Oakbank, 4 in.; St. Johns, 10 in.

21. Norquay, 4 in.; Schrieber, 6 in.; Missanabie, 6 in.; Nipigon, 4 in.; White River, 6 in.

22. Mellenduin, 4 in.; Princeton, 4 in.; Wiarton, 8 in.; Goderich, 5 in.; Midland, 6 in.; Presque Isle, 6 in.; Parker's Ridge, 4 in.; St. Mary's, 7 in.; Gravenhurst, 4 in.; Owen Sound, 5 in.; Orillia, 10 in.; Father Point, 4 in.; Saugeen, 6 in.; White River, 10 in.; Coldwater, 6 in.; Stratford, 10 in.; Durham, 7 in.; Woodstock, 4 in.; Barrie, 6 in.

23. Sunshine, 4 in.; Presque Isle, 7 in.; Blenheim, 5 in.; Wiarton, 8 in.; Mount Forest 5 in.; Dalhousie, 8 in.; Owen Sound, 6 in.; Saugeen, 6 in.; Bathurst, 9 in.; Coldwater, 10 in.; Stratford, 4 in.; Barrie, 9 in.

24. Midland, 4 in.; Owen Sound, 5 in.; Saugeen, 5 in.

25. Waterford, 10 in.; Spence, 5 in.; Elora, 5 in.; Owen Sound, 6 in.; Trenton, 14 in.; Brantford, 12 in.

26. Wyoming, 4 in.; Wilton Grove, 6 in.; Orangeville, 14 in.; Deer Park, 14 in.; Scarborough, 8 in.; Oliver's Ferry, 10 in.; Presque Isle, 6 in.; Denbigh, 10 in.; Goderich, 8 in.; Midland, 6 in.; Clontarf, 11 in.; Point des Monts, 5 in.; Point Lepreux, 5 in.; Brome, 4 in.; Sprucedale, 10 in.; Halifax, 4 in.; Chatham, 4 in.; Father Point, 6 in.; St. Andrews, 5 in.; Quebec, 5 in.; Port Dover, 9 in.; Birnam, 6 in.; Owen Sound, 5 in.; Trenton, 6 in.; Brantford, 12 in.; Haliburton, 4 in.; Port Stanley, 8 in.; Saugeen, 8 in.; Parry Sound, 8 in.; Rockliffe, 12 in.; Kingston, 7 in.; Bathurst, 6 in.; Lindsay, 10 in.; Deseronto, 14 in.; London, 4 in.; Stratford, 12 in.; Woodstock, 6 in.; Welland, 6 in.; Ottawa, 6 in.; Montreal, 9 in.; Toronto, 8 in.; Georgetown, 10 in.; Ennismore, 12 in.; Hunts-



ville, 11 in. ; Coldstream, 5 in. ; Point Escuminac, 5 in. ; Channell, 9 in. ; Biscostasing, 5 in. ; Parker's Ridge, 7 in. ; Conestoga, 6 in. ; Pincher Creek, 10 in. ; Barrie, 6 in.

27. Wiarton, 4 in. ; Midland, 4 in. ; Pincher Creek, 5 in. St. Hyacinthe, 4 in. ; Beatrice, 5 in. ; Gravenhurst, 14 in. ; Paris, 6 in. ; Saugeen, 5 in. ; Fredericton, 4 in. ; Durham, 6 in. ; Ottawa, 6 in.

28. Missanabie, 4 in. ; Beatrice, 12 in. ; Haliburton, 4 in. ; Parry Sound, 8 in.

29. Waterford, 5 in. ; Pincher Creek, 4 in. ; Sprucedale, 4 in. ; Parry Sound, 5 in.

30. Presque Isle, 8 in. ; Glacier, 6 in. ; Pincher Creek, 9 in.

31. Wiarton, 4 in. ; Glacier, 5 in. ; Heron Bay, 10 in. ; Clontarf, 4 in. ; Durham, 4 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Savanne, Clontarf, IV ; Alameda, Calgary, II ; Port Simpson, Channel Island, IV.

2. Savanne, Hillview, IV ; Portage la Prairie, Pembina Crossing, IV ; Glacier, Channel Island, II.

3. Savanne, Pembina Crossing IV ; Winnipeg, IV.

4. Savanne, Portage la Prairie, IV ; Brantford.

5. Channel Island, III ; Channel Island III.

7. Savanne, Portage la Prairie ; Winnipeg, IV.

8. Savanne, Stratford, IV ; Winnipeg, IV.

15. Medicine Hat, IV.

16. Fort Steele, IV ; Georgetown, IV ; Huntsville, III ; St. Albans, II ; Hillview, III ; Pembina Crossing, IV ; Belmont.

17. Hillview, IV ; Portage la Prairie, Clontarf, IV ; Henrietta, II ; Moose Jaw, IV ; Quebec, III ; White River, Minnedosa, III ; Fredericton, III ; Truro, IV ; Haileybury, III.

18. Haliburton, IV ; Hillview, II ; Alameda, Channel Island, IV ; Qu'Appelle, III ; Fredericton, II ; Haileyburg, IV.

19. Denbigh, IV ; Georgetown, IV ; Elora, Gravenhurst, IV ; St. Albans, III ; Moose Jaw, IV ; Niagara, III ; Bancroft, IV ; Brandon, St. Andrews, IV ; Quebec, III ; Minnedosa, II ; Kingston, III ; Medicine Hat, IV ; Truro, III ; Haileybury, II ; Durham, IV ; Ottawa, IV.

20. Hillview, IV ; Portage la Prairie, Shoal Lake, III ; Pembina Crossing, III ; Cape Chatte, Channel Island, III ; Medicine Hat, IV.

21. Shoal Lake, II ; Pembina Crossing, IV ; Moose Jaw, IV ; Calgary, IV ; Swift Current, III ; Battleford, IV.

22. Hillview, IV ; Portage la Prairie, Belmont, Moose Jaw, III ; Channel Island, IV ; Battleford, IV.

23. Elora, Hillview, IV ; Minnedosa, III ; Qu'Appelle, III ; Medicine Hat, IV ; Haileybury, IV.

24. Fort Steele, IV ; Hillview, IV ; Portage la Prairie, Pembina Crossing, IV ; Minnedosa, II ; Medicine Hat, IV ; Prince Albert, III ; Haileybury IV.

25. Loch Erroch, Hillview, IV.

26. Hillview, IV.

27. Pembina Crossing, IV ; Kingston, III.

28. Moose Jaw, Channel Island, III ; Winnipeg, IV.

29. Portage la Prairie, Minnedosa, II.

30. Minnedosa, IV.

31. Pembina Crossing, IV ; Niagara, IV ; Quebec, IV., Minnedosa, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF JANUARY, 1885.

	HOURS ENDING															
	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	NOON	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
ESQUIMALT .....				0 01	0 16	0 23	0 25	0 31	0 19	0 18	0 08					
AGASSIZ, B. C. ....				00	11	32	32	34	37	32	20	8				
INDIAN HEAD.....				16	35	45	51	55	54	48	32	8				
BRANDON.....				03	20	34	42	52	48	35	11					
WINNIPEG.....			0 01	26	44	52	51	50	50	45	29	04				
WOODSTOCK.....				02	14	23	37	33	33	37	23	09				
TORONTO.....		8	04	26	27	29	37	41	38	38	25	05				
LINDSAY.....			01	19	20	35	38	43	42	34	30	16	10			
BARRIE.....			02	13	17	25	30	35	35	29	19	01				
KINGSTON.....			03	19	29	32	28	26	28	34	23	02				
MONTREAL.....				26	39	46	52	47	38	16						
FREDERICTON.....			01	18	36	45	49	47	44	39	15	07				
				ESQUIMALT.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.	
MEAN PROPORTION FOR MONTH.....				0 16	0 22	0 29	0 40	0 42	0 23	0 29	0 22	0 25	0 40	0 35		
(Constant sunshine being 1.)																
MAXIMUM DAILY AMOUNT.....				0 75	0 73	0 82	0 88	0 92	0 84	0 90	0 94	0 93	0 93	0 97	0 88	
DATE.....				21	21	26	11	3	10	9	27	23	4	18	5	
NO. OF DAYS COMPLETELY CLOUDED.....				16	14	11	10	8	14	9	13	13	9	12	11	

### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 625. These were divided as follows:—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA.....	92	62	22	8	79.3
LOWER LAKE REGION.....	125	77	36	12	76.0
UPPER ST. LAWRENCE.....	109	74	21	14	77.5
LOWER ST. LAWRENCE.....	99	69	15	15	77.3
GULF.....	91	67	11	13	79.7
MARITIME PROVINCES.....	109	76	24	9	80.7
TOTAL.....	625	425	129	71	78.3

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

### STORM WARNINGS.

During the month warnings on the approach of six storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings

issued was 114, of which 81 were verified. At 21 stations the force did not reach that indicated by the signal displayed.

In connection with the warnings, predictions as to probable directions of the wind were given and of the 81 warnings verified as to force 81 were fully verified.

1. At 10 a.m. on the 3rd, all eastern stations open to navigation were warned to expect a strong gale from the eastward, in advance of a depression then over the Lakes, which was moving eastward. Next day a strong gale set in over the Maritime Provinces, blowing at first from the eastward and shifting by night of the 4th to the westward; at which time the depression moved off the Nova Scotian Coast.

2. At 10.30 a.m. on the 6th, all eastern stations were warned for a strong gale from the E. veering to S. and S.W., in advance of an extensive area of low pressure then central over the Lakes. Steep gradients passing over the Maritime Provinces during the night of the 6th caused a moderate to fresh gale at many stations, but the depression dispersed over the Lakes and the winds continued south-easterly in eastern Canada.

3. All eastern stations were warned at 10.25 p.m. on the 10th for a strong easterly gale. A depression had moved directly north from Florida to the Lakes, whilst the pressure continued decidedly high over eastern Canada, in consequence of which gradients became much steepened there. A moderate to fresh south-easterly gale set in during the night or next morning and continued until the night of the 11th.

4. In advance of a depression central over New York State on the morning of the 13th, all eastern stations were warned at 9.40 a.m. for a strong easterly gale. A fresh S.E. to S.W. gale set in that night in the Bay of Fundy, but the depression passed due north and did not affect the Atlantic Coast stations.

5. At 11.30 a.m. on the 21st, eastern stations were warned for a strong gale from the S.E. shifting to S. and S.W. At the time a storm of considerable energy, which had come from the Western States, was central over Wisconsin. On reaching the Maritime Provinces it decreased somewhat in energy, but caused a moderate to fresh S.E. gale at most of the stations warned. The storm eventually dispersed over eastern Canada.

6. Stations in the Bay of Fundy and along the Atlantic Coast, as far as the Gut of Canso, were warned at 10.25 p.m. on the 25th to expect a strong easterly gale, and at 11.25 p.m. Cape Breton stations were similarly warned. At the time an important storm, which had started in Texas, was central over Illinois. The storm continued to move northeastward, passing over the Maritime Provinces on the night of the 26th. The gale was general in eastern Canada, blowing, at first from the S.E. and afterwards from the S.W.

#### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR JANUARY, 1895.

Mean westerly declination.....	4° 45'·2
Increase from January, 1894.....	5'·4
Mean horizontal force.....	0·16632
Increase from January, 1894.....	0·00003
Mean vertical force.....	0·60382
Increase from January, 1894.....	0·00055

The month was free from any important disturbances. Between 2 and 7 p.m. of the 1st the declination magnet was slightly disturbed, and again on the 2nd up to 9 p.m. At 9.30 p.m. of the 5th the declination magnet took up a gradual easterly swing of 14' the minimum reading being reached at 9.58 p.m.; at midnight the magnet was steady, but after 2 a.m. was again disturbed for some hours. Between 7.50 and 10 p.m. of the 7th the needle was from 5' to 12' east of normal and on the 9th from 4 until about 8 a.m. it was slightly disturbed. Both declination and horizontal force magnets were disturbed between 10 p.m. of the 9th and the following morning, and also again on the following nights, beginning at midnight on the 10th and somewhat earlier on the 11th. On the 13th there was a slight disturbance in declination between 2 and 4 p.m. From 9.35 p.m. of 16th until 6 a.m. 21st the declination magnet was continually disturbed, the greatest departure from normal occurred on the evening of the 11th, an easterly swing began at 7.10 p.m., at 8 p.m. it was 18' east of normal and by 9.35 had again almost returned to its normal position.

There were no auroras observed during the month. On the 2nd, 4th, 8th, 14th, 15th, 16th, 19th, 23rd, 27th, 28th, 29th, 30th and 31st the sky was clear, but on the other nights clouds would have prevented an aurora being seen had one existed.

R. F. STUPART, .  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, April 16th, 1895.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

FEBRUARY, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SYNOPSIS OF THE WEATHER.

The chart of mean atmospheric pressure for February shows a very remarkable distribution of pressure. The mean average pressure curve runs southeast from the western portion of Lake Superior to the South Atlantic States, and east of this the pressure diminishes rapidly until at Sable Island the greatest amount below average is recorded, namely, .330 inch. To the west of the mean curve, the pressure increases to .4150 inch over the greater portion of the Pacific States, as well as over the Northwest, the West and the Southwest States, diminishing again to the average on the Coast of California.

Temperature distribution is equally remarkable; the greatest amount below average occurs over Southern Texas, 18°. Florida gives from 6° to 14° below average. In the Northwest Territories and British Columbia it was from 6° to 11° above average, in the Lower St. Lawrence, the Gulf, and in Newfoundland from 1° to 3° above average, and in Ontario from a little below average in the northern portion, it quickly decreased to as much as 9° below average in the southern portion.

1st—10th. During this protracted period some of the most severe, and in the Lake Region especially, perhaps the most severe weather on record was experienced. The great cold spell was first shown on the 3rd and 4th in the Northwest Territories accompanying an important anti-cyclonic system, when Prince Albert reported temperatures of 50° and 52° below zero. Three low pressure areas followed one another up the Atlantic during the interval herein embraced, and the second and third were storms of unusual severity. The effect of this series of storms was to cause a preponderance of strong winds and gales over the greater portion of Canada from the Lakes eastward. In the Lake Region the gradients were for west and north west winds, thereby drawing down over Ontario the great Northwest cold, but further east the westerly gradient was not so pronounced. A good deal of snow fell, more particularly in the Maritime Provinces: the heaviest and most general fall occurred on the 8th, when the attending high winds caused serious drifting, especially in Ontario and Quebec, greatly impeding railway and all kinds of travel.

After this period of remarkable weather and up to the 16th, it was generally moderately cold and for the most part fine, although a few light local snowfalls occasionally occurred, noticeably in the Northwest Territories on the 11th, and from the Lakes to the Atlantic on the 13th.

On the 16th, a depression of some importance traversed the Northwest Territories giving a general and as a rule a light snowfall, and between the 18th and 19th, it brought light falls of snow in Ontario, Quebec, and the Maritime Provinces, when in many places the temperature rose to the freezing point or a few degrees above.

A rather deep disturbance which passed over the North west Territories on the 19th, brought

there quite mild weather as well as a few light local snowfalls. On the 20th, it gave strong winds and moderate gales from the south and west in the Lake Region together with a fall of snow which was heavy in the Georgian Bay district. On the 21st, it caused strong winds and light snowfalls in the St. Lawrence Valley, and on the 22nd, light rain and snow in the Maritime Provinces.

Colder weather ensued in the Northwest Territories, and on the morning of the 22nd, a moderate anticyclone covered the Saskatchewan and Qu'Appelle Valleys, and Prince Albert reported  $30^{\circ}$  below zero. In Ontario and Quebec the weather was colder on the 21st, the following day it turned colder in the Maritime Provinces, and afterwards as the Northwest anticyclone passed over the country to the Atlantic it caused a continuance of cold weather from the Lakes to our Atlantic seaboard for several days.

A depression which passed over the Northwest on the 23rd attended by comparatively mild weather, brought strong south to west winds, milder weather and local snowfalls in Ontario on the 24th, and a more general snowfall in Quebec on the 25th. It also gave light snow and sleet on the 25th and 26th in the Maritime Provinces.

The depression was immediately followed by high pressure, and fine and moderately cold weather. This gave way during the last two days of the month to the passage of a depression from the Northwest which brought the maximum temperatures of the month in many places, more especially in Ontario and Manitoba. The depression was likewise pretty generally accompanied by a little light rain or snow.

### TEMPERATURE.

The temperature in British Columbia was from  $6^{\circ}$  to  $11^{\circ}$  above the average, and from  $3^{\circ}$  upwards as compared with February, 1894. In the Northwest Territories and Manitoba it was from  $2^{\circ}$  to  $7^{\circ}$  above. In Ontario, the northern part was about the average, but the central part was  $5^{\circ}$  below and extending to the south and south-west district it reached in many places as much as  $9^{\circ}$  below. In Quebec, north of the St. Lawrence it differed little from the average, east of Quebec it was from  $3^{\circ}$  to  $5^{\circ}$  above. In the Maritime Provinces it was about the average.

*The Highest and Lowest Temperatures in each Province during February were :*

British Columbia,  $71^{\circ}6$  on 28th at Alberni,  $-25^{\circ}6$  on 11th at Stuart's Lake.

Northwest Territories,  $56^{\circ}1$  on 27th at Medicine Hat,  $-51^{\circ}0$  on 4th at Prince Albert.

Manitoba,  $48^{\circ}0$  on 28th at Emerson,  $-50^{\circ}0$  on 5th at Oakbank.

Ontario,  $52^{\circ}0$  on 27th at Port Arthur,  $-59^{\circ}7$  on 6th at White River.

Quebec,  $41^{\circ}0$  on 28th at Brome,  $-25^{\circ}0$  on 23rd at Brome.

New Brunswick,  $43^{\circ}9$  on 11th at Chatham,  $-21^{\circ}0$  on 4th at Dalhousie.

Nova Scotia,  $42^{\circ}5$  on 26th at Sydney,  $-15^{\circ}0$  on 16th at Truro.

Prince Edward Island,  $35^{\circ}5$  on 19th at Charlottetown,  $-10^{\circ}0$  on 25th at Georgetown.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT ALL STATIONS IN THE DOMINION OF CANADA, FEBRUARY, 1895.

• Stations not furnished with Registering Thermometers.

[illegible]

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT ALL STATIONS IN THE DOMINION OF CANADA, FEBRUARY, 1895.

[illegible]





## PRECIPITATION.

The rainfall throughout the Dominion has been very much below the average with the exception of part of British Columbia, but even there the average of the whole province is below that of 1894.

*The general distribution is as follows :—*

In British Columbia the rainfall on the coast 3'60 in., or 1'20 in. less than 1894. In some parts of the interior none has fallen.

In the North-west Territories only a few drops has fallen.

In Manitoba no rain is recorded except a few drops at one or two stations about the 20th.

In Ontario West and South-west District, it was 0'13 in., or 0'03 in. below the average. In the North and North-west District, it was 0'09 in., or 0'45 in. below the average. In the Central District, it was 0'09 in., or 0'56 in. below the average; and in the East and North-east District it was 0'03 in., or 0'66 in. below the average.

In Quebec it was inappreciable, or 0'34 in. below the average.

In New Brunswick it was 0'09 in., or 1'37 in. below the average.

In Nova Scotia it was 0'30 in., or 1'49 in. below the average.

In Prince Edward Island it was 0'00 in., or 0'85 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA—Agassiz, 7'73 in.; Abbotsford, 6'47 in.; Langley, 6'83 in.; Loch Erroch, 11'73 in.; Chilliwack, 6'79 in.; Beaver Creek, 10'46 in.; Union, 8'84 in.; Goldstream Lake, 5'24 in.; Hazelmere, 5'14 in.; Sproat Lake, 14'06 in.; Rivers Inlet, 15'74 in.; Port Simpson, 12'82 in.

BERMUDA—Prospect, 5'75 in.

*Rainfall one inch and upwards in 24 hours :—*

BRITISH COLUMBIA—Agassiz, 20th, 2'00 in.; 27th, 1'12 in. Abbotsford, 15th, 1'42 in.; 18th, 1'15 in. N. Westminster, 23rd, 1'01 in. Langley, 19th, 1'27 in. Loch Erroch, 2nd, 1'60 in.; 16th, 1'27 in.; 17th, 1'05 in.; 18th, 1'20 in.; 19th, 2'60 in. Rivers Inlet, 5th, 1'74 in.; 15th, 1'38 in.; 17th, 1'21 in.; 18th, 2'04 in.; 19th, 1'66 in.; 25th, 1'84 in.; 26th, 2'47 in. Port Simpson, 2nd, 1'38 in.; 3rd, 1'15 in.; 4th, 1'88 in.; 24th, 1'17 in. Chilliwack, 10th, 1'40 in.; 19th, 1'99 in. Beaver Creek, 15th, 2'02 in.; 17th, 1'32 in.; 25th, 1'38 in.; 26th, 3'10 in. Union, 15th, 1'57 in.; 25th, 1'50 in.; 26th, 2'40 in. Goldstream Lake, 10th, 1'40 in. Sproat Lake, 15th, 1'50 in.; 16th, 1'45 in.; 17th, 1'40 in.; 19th, 1'45 in.; 25th, 2'05 in.; 26th, 2'05 in.; 27th, 2'04 in.

NOVA SCOTIA—Halifax, 2nd, 1'08 in. Sable Island, 2nd, 1'05 in.

NEW BRUNSWICK—St. John, 10th, 1'20 in.; 21st, 1'50 in.

## SNOWFALL.

The snowfall in Ontario, except in the North-west District, was very small. In Quebec, New Brunswick, Nova Scotia and Prince Edward Island it was very large. In Manitoba and the North-west Territories the amount is about the same as in 1894 but in British Columbia, although at some stations from four to six feet has fallen, the general amount is only about one-half of the fall in 1894.

*The general distribution is as follows :*

In British Columbia 8'5 has fallen, but some stations report as much as 4 to 6 feet.

In the North west Territory the average amount is about the same as in February, 1894, 6'0 in. or 1'5 in. above the average.

In Manitoba 5'0 in. has fallen, or about double the average.

In the Districts of Ontario the amount is 10'0 in. or 0'5 in. below the average; 18'9 in. or 4'4 in. above the average; 8'0 in. or 3'0 in. below the average; 11'3 in. or 4'5 in. below the average.

In Quebec 2'0 in., or 8'0 in. above the average.

In New Brunswick 2'0 in., or 6'6 in. above the average.

In Nova Scotia 3'0 in., or 15'1 in. above the average.

In Prince Edward Island 3'0 in., or 16'7 in. above the average.

*Snowfall, 15 inches and upwards during month.*

BRITISH COLUMBIA—Glacier, 7'0 in.; Pilot Bay, 26 in.; Griffin Lake, 44 in.; Barkerville, 52 in.; Stuart's Lake, 15 in.

N. W. TERRITORIES.—Pincher Creek, 17½ in.

ONTARIO.—Sault Ste. Marie, 22 in.; Missanabie, 19 in.; Burk's Falls, 16 in.; Lakefield, 16 in.; Clontarf, 17 in.; Lucknow, 16 in.; Midland, 17 in.; Orangeville, 17 in.; Sunshine, 19 in.; Mount Forest, 15 in.; Wiarton, 26 in.; Presque Isle, 28 in.; Orillia, 17 in.; Gravenhurst, 16 in.; Point Pelee, 46 in.; Coldwater, 25 in.; Parry Sound, 31 in.; Saugeen, 37 in.; Port Dover, 17 in.; Ottawa, 20 in.; Durham, 49 in.; Huntsville, 15 in.; Bancroft, 16 in.; Thorold, 17 in.; Peterborough, 17 in.; Point Clark, 30 in.; Sprucedale, 15 in.; Spence, 24 in.; Mattawa, 15 in.; Uplands, 33 in.; Beatrice, 25 in.; Bognor, 28 in.; North Bruce, 24 in.

QUEBEC.—Point des Monts, 23 in.; Cape Magdalen, 44 in.; Anticosti, W. P., 47 in.; St. Hyacinthe, 27 in.; Brome, 23 in.; Richmond, 14 in.; Father Point, 37 in.; Quebec, 20 in.; Montreal, 25 in.

NEW BRUNSWICK.—Dalhousie, 33 in.; Point Lepreaux, 24 in.; Point Escuminac, 35 in.; St. John, 28 in.; St. Andrews, 30 in.; Chatham, 27 in.; Grand Manan, 19 in.; Bathurst, 40 in.

NOVA SCOTIA.—Pictou, 71 in.; Digby, 24 in.; New Glasgow, 34 in.; Whitehead, 42 in.; Port Hastings, 31 in.; Sydney, 38 in.; Halifax, 34 in.; Truro, 46 in.; Sable Island, 27 in.; Port Morien, 35 in. In PRINCE EDWARD ISLAND,—Charlottetown, 44 in.; Georgetown, 35 in.

NEWFOUNDLAND.—St. Johns, 21 in.; Channell, 34 in.

*Snowfall 4 in. and upwards in 24 hours.*

1. Saugeen, 7 in.; Durham, 6 in.; Port Morien, 6 in.; Peterboro, 9 in.
2. St. Andrews, 5 in.; Sydney, 5 in.; Charlottetown, 7 in.; Chatham, 6 in.; Georgetown 4 in.; Midland, 5 in.; Wiarton, 4 in.; Pictou, 4 in.; Point Escuminac, 4 in.; Anticosti, W. P., 4 in.
3. St. Johns, 6 in.; Parry Sound, 5 in.; Channell, 12 in.
4. Edmonton, 5 in.; Saugeen, 5 in.; Point Clark, 5 in.; Point Lepreaux, 4 in.
5. St. Andrews, 6 in.; Chatham, 10 in.; Grand Manan, 5 in.; Sydney, 7 in.; Yarmouth, 10 in.; Charlottetown, 20 in.; Halifax, 7 in.; St. John, 6 in.; Father Point, 8 in.; Bathurst, 15 in.; Truro, 13 in.; Fredericton, 5 in.; Port Morien, 9 in.; North Bruce, 5 in.; Georgetown, 10 in.; New Glasgow, 12 in.; Dalhousie, 14 in.; Parker's Ridge, 6 in.; Point Escuminac, 6 in.; Anticosti, W. P., 7 in.; Calgary, 4 in.; Whitehead, 4 in.; Port Hastings, 5 in.
6. Digby, 12 in.; Pictou, 48 in.; Cape Magdalen, 12 in.; Anticosti, W. P., 8 in.
7. Cowal, 4 in.; Point Lepreaux, 8 in.; Cape Magdalen, 12 in.
8. St. Andrews, 9 in.; Chatham, 9 in.; Yarmouth, 4 in.; Halifax, 4 in.; Father Point, 7 in.; Quebec, 6 in.; Parry Sound, 4 in.; Saugeen, 8 in.; Kingston, 6 in.; Bathurst, 12 in.; Ottawa, 18 in.; Uplands, 4 in.; Montreal, 4 in.; Port Morien, 7 in.; Bancroft, 9 in.; Stouffville, 5 in.; Mattawa, 6 in.; Clontarf, 14 in.; Oliver's Ferry, 4 in.; Eganmore, 6 in.; Parker's Ridge, 15 in.; Point Escuminac, 6 in.; Point des Monts, 6 in.; St. Hyacinthe, 15 in.; Brome, 8 in.; Chicoutimi, 8 in.
9. Father Point, 7 in.; Truro, 13 in.; Sable Island, 11 in.; Thorold, 6 in.; Point Clark, 15 in.; St. George, 4 in.; Waterford, 5 in.; Dalhousie, 8 in.; Point Lepreaux, 4 in.; Anticosti, W. P., 5 in.; St. Hyacinthe, 8 in.; Brome, 6 in.; Richmond, 8 in.; Port Hastings, 11 in.
10. Chatham, 4 in.; Durham, 6 in.; Presque Isle, 6 in.; New Glasgow, 9 in.; Point Escuminac, 8 in.; Whitehead, 10 in.
11. Winnipeg, 4 in.; Port Morien, 4 in.; Whitehead, 4 in.; Port Hastings, 4 in.
13. Father Point, 5 in.; Bathurst, 8 in.; Sable Island, 4 in.; Dalhousie, 4 in.; Cape Magdalen, 4 in.; Whitehead, 4 in.
14. Sable Island, 9 in.; Glastonbury, 4 in.; Digby, 4 in.; Pictou, 6 in.; Richmond, 4 in.
16. Duck Lake, 4 in.; Saskatoon, 4 in.
17. Winnipeg, 4 in.; Elkhorn, 4 in.; Savanne, 4 in.; Oakbank, 6 in.
18. Spence, 4 in.; Thompson, 4 in.
19. Huntsville, 4 in.; Sprucedale, 6 in.; Upland, 4 in.; Sunshine, 4 in.
20. Sydney, 5 in.; Halifax, 8 in.; Truro, 4 in.; Port Morien, 8 in.; Peterboro, 4 in.; Spence, 5 in.; Beatrice, 4 in.; Sault Ste. Marie, 5 in.; Missanabie, 6 in.; Gravenhurst 6 in.; Pictou, 6 in.; Port Hastings, 6 in.
21. Deseronto 4 in.; Coldwater, 5 in.; White River, 4 in.; Parry Sound, 5 in.; Saugeen, 5 in.; Port Dover, 17 in.; Durham, 12 in.; Woodstock, 6 in.; Lindsay, 6 in.; Huntsville, 5 in.; Whiteside, 4 in.; Point Clark, 4 in.; Spence, 6 in.; Sault Ste. Marie, 5 in.; Missanabie, 4 in.; Wiarton, 8 in.; Conestogo, 5 in.; Lakefield, 4 in.; Midland 5 in.; Orangeville, 7 in.; Mount Forest, 6 in.; Waterford, 21 in.; Presque Isle, 6 in.; Goderich, 4 in.; Channell, 7 in.; Whitehead, 8 in.

22. St. Andrews, 4 in.; Uplands, 4 in.; Thompson, 5 in.; Point des Monts, 8 in.; Anticosti, W. P., 5 in.; Point Pelee, 10 in.
23. Thorold, 4 in.; Whitehead, 4 in.
24. Burk's Falls, 4 in.
25. Quebec, 6 in.; Durham, 9 in.; London, 4 in.; Sprucedale, 1 in.; Spence, 6 in.; Uplands, 5 in.; Beatrice, 4 in.; Point des Monts, 6 in.; Anticosti, W. P., 7 in.
26. Picton, 4 in.; Cape Magdalen, 6 in.
28. Elkhorn, 13 in.; Pincher Creek, 6 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Portage la Prairie, Prince Albert, IV; Minnedosa, IV; Truro, IV; Haileybury, IV; Savanne, New Glasgow, Treherne, II; Shoal Lake, III.
2. Portage la Prairie, Henrietta, II; Prince Albert, II; Minnedosa, IV; Quebec, IV; Savanne, Pembina Crossing, IV.
3. Portage la Prairie, Minnedosa, IV; Chicoutimi, Channel Island, IV; Pembina Crossing, IV.
4. Elora.
5. Elora.
6. Channel Island, IV.
7. Prince Albert, II.
8. Portage la Prairie, Prince Albert, II.
9. Chicoutimi, III.
11. St. Alban's, II; Alameda, IV; Elkhorn, I.
12. Moose Jaw, IV; Alameda, IV; Elkhorn, II.
13. St. Alban's, II; Saskatoon, IV; Minnedosa, IV; Medicine Hat, II; Elkhorn, II; Haileybury, IV; St. Alban's, II; Hillview, III; Treherne, IV; Shoal Lake, IV.
14. Emerson, IV; Portage la Prairie, Saskatoon, IV; Moose Jaw, IV; Minnedosa, IV; Ottawa, III; Qu'Appelle, III; Medicine Hat, III; Battleford, IV; St. Andrew's, IV; Grand Manan, IV; Elora, Savanne, Beatrice, IV; Bognor, IV; Birnam, IV; Alton, IV; Georgetown, Belmont, Treherne, III; Pembina Crossing, III; Shoal Lake, III; Clontarf, IV; Lucknow, Midland, I; Denbigh, I; Georgetown, Ont., III; Wyoming, Dalhousie, Channell, III; St. Alban's, II; Hillview, II; Brandon, Channel Island, V; Charlottetown, IV; Father Point, II; White River, IV; Saugeen, IV; Kingston, III; Durham, IV; Fredericton, Haileybury, III; Montreal, Huntsville, II; Bancroft, II; Toronto, IV; Stouffville, IV; Point Clark, IV; Georgina, IV; Spence, I; Virgil, IV; Stoney Creek, III; Welland, IV; Gravenhurst, III.
15. Emerson, IV; St. Alban's, II; Portage la Prairie, Saskatoon, II; Moose Jaw, IV; Deseronto, II; Battleford, III; St. Andrew's, IV; Grand Manan, IV; Yarmouth, IV; Charlottetown, IV; Truro, III; Welland, IV; Elora, Savanne, Beatrice, III; Bognor, IV; Birnam, IV; Sault Ste. Marie, Alton, II; Georgetown, Lucknow, Midland, II; Denbigh, II; Wyoming, *very bright*; Gravenhurst, III; Dalhousie, St. Alban's, II; Hillview, IV; Channel Island, III; Treherne, III; Halifax, IV; Father Point, III; White River, II; Port Arthur, II; Parry Sound, I; Saugeen, III; Port Stanley, III; Kingston, IV; Port Dover, IV; Durham, III; Lindsay, IV; Sable Island, Haileybury, II; Huntsville, III; Bancroft, II; Toronto, III; St. Anne, Ont., IV; Peterboro', II; Point Clark, IV; Georgina, IV; Cottam, Spence, I; Virgil, II; Galt, Stoney Creek, III.
16. Portage la Prairie, Alameda, Medicine Hat, IV; Battleford, IV; Halifax, IV; Port Arthur, I; Durham, IV; Truro, III; Haileybury, IV; St. Anne, Ont., IV; Virgil, IV; Savanne, Sault Ste. Marie, Georgetown, Ont., IV; Gravenhurst, IV; Pembina Crossing, IV.
17. Saskatoon, IV; Father Point, IV; Kingston, I; Truro, IV; Sault Ste. Marie.
18. Prince Albert, III; Hillview, IV; Treherne, IV; Pembina Crossing, IV.
19. Gravenhurst, IV.
20. Father Point, IV; Elkhorn, II; Virgil, IV; Treherne, IV; Pembina Crossing, IV.
21. Portage la Prairie, Qu'Appelle, III; Haileybury, IV; Savanne, Hillview, IV.
22. Cottam, Welland, III; Hillview.
23. Yorkton, II; Emerson, III; Saskatoon, IV; Moose Jaw, IV; Prince Albert, III; Medicine Hat, III; Banff, IV; St. Andrew's, IV; Yarmouth, IV; Father Point, II; Quebec, III;

White River, IV; Truro, III; Elora, Brantford, IV; Savanne, Birnam, IV; Alton, II; Haliburton, IV; Clontarf, III; Lucknow, Georgetown, Ont., IV; Richmond, II; Chicoutimi, III; Kingston, I; Dunham, IV; Fredericton, III; Haileybury, IV; Bancroft, I; Toronto, IV; Sprucedale, St. Anne, Ont., IV; Point Clark, IV; Virgil, IV; Galt, Stoney Creek, III; Welland, I.

24. Portage la Prairie, Moose Jaw, IV; Henrietta, III; Swift Current, II; Prince Albert, III; Medicine Ha, IV; Battleford, II; Banff, IV; Grand Manan, IV; Truro, IV; Welland, II; Sault Ste. Marie, Pembina Crossing, IV.

25. Alameda, Minnedosa, IV.

27. Moose Jaw, IV; Alameda, Truro, IV; Haileybury, IV; Savanne, Belmont, Pembina Crossing, III.

28. Emerson, I; Portage la Prairie, Moose Jaw, IV; Swift Current, III; Medicine Hat, IV; Treherne, III.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF FEBRUARY, 1895.

	HOURS ENDING															
	5	6	7	8	9	10	11	NOON	1	2	3	4	5	6	7	8
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.		P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
ESQUIMALT .....				0.04	0.06	0.15	0.24	0.30	0.31	0.28	0.27	0.15	0.04			
KUPER ISLAND .....				.02	.17	.23	.28	.26	.36	.38	.39	.09				
AGASSIZ, B. C. ....				.8	.14	.29	.36	.39	.39	.32	.29	.25	.06			
INDIAN HEAD.....																
BRANDON.....				.19	.42	.54	.57	.62	.67	.62	.49	.15				
WINNIPEO.....				.19	.41	.51	.55	.62	.61	.62	.64	.56	.30			
WOODSTOCK.....			.01	.11	.28	.45	.50	.54	.46	.44	.45	.29	.04			
TORONTO.....				.22	.41	.49	.51	.47	.51	.48	.46	.42	.28	.8		
LANDSAY.....				.16	.51	.41	.45	.43	.45	.50	.45	.36	.32	.26		
BARRIE.....			.01	.11	.25	.42	.49	.36	.46	.47	.43	.36	.15	.01		
KINGSTON .....			.02	.24	.36	.44	.44	.42	.47	.48	.52	.46	.26			
MONTREAL.....				.11	.28	.40	.51	.61	.62	.59	.49	.36	.11			
FREDERICTON .....				.11	.30	.44	.48	.45	.45	.52	.50	.46	.39	.04		
MEAN PROPORTION FOR MONTH.....				0.18	0.20	0.30			0.48	0.49	0.57	0.41	0.39	0.33	0.39	0.47
(Constant sunshine being 1.)																
MAXIMUM DAILY AMOUNT .....				0.82	0.71	0.80			0.88	0.91	0.92	0.92	1.00	0.93	0.93	1.00
DATE .....				19	19	8			22	22	2	2	5	11	5	11
NO. OF DAYS COMPLETELY CLOUDED .....				15	9	13			5	5	9	4	7	6	4	9

# STORM WARNINGS.

During the month warnings on the approach of four storms were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 54, of which 42 were verified. At 4 stations, however, the force exceeded, that indicated by the signals displayed and 3 stations reported warnings received late, owing to delay in issue.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 42 warnings verified as to force 24, or 57.1 per cent were fully verified, and 42, or 100 per cent were fully and partially verified.

No. 1. At 11 h. on the 2nd, all stations in the Gulf of St. Lawrence, Bay of Fundy and along the Atlantic Coast were warned for a moderate westerly gale, in advance of a depression then off the Carolina Coast. By night it had reached the Maritime Provinces, passing over which it caused a moderate to fresh N. E. to N. W. gale during the night and on the 3rd.

No. 2. All eastern stations were warned at 11 h. on the 4th for a strong east to south and south-west gale. At the time a depression was situated off the middle Atlantic Coast; by night it was off the Nova Scotia Coast and had developed considerably. A severe storm set in throughout the Maritime Provinces, the wind starting at first from the eastward, gradually shifted to north westward and tremendously high seas were reported along the Atlantic Coast. On the morning of 4th the storm was central near Sable Island, from thence it moved to the Gulf of St. Lawrence and then passed over Newfoundland with diminished energy.

No. 3. At 12 h. on the 7th, all eastern stations were warned for a strong easterly gale in advance of a depression then off the New Jersey Coast. By night it was off the Coast of Maine and a strong easterly gale had set in throughout the district named. From the Maine Coast the storm moved due north to Quebec and then passed eastward off the Atlantic Coast.

No. 4. On the 20th at 22 h., all eastern stations were warned for a moderate westerly gale, in advance of a depression then over the Lakes, which, however, on reaching the Maritime Provinces became unimportant and only gave strong winds.

### PROBABILITIES.

The probabilities issued by this office at 11 p. m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 572. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	80	07	7	6	88 1
LOWER LAKE REGION .....	103	89	13	10	84 0
UPPER ST. LAWRENCE .....	94	71	16	7	84 0
LOWER ST. LAWRENCE.....	91	75	10	6	87 9
GULF.....	95	77	13	5	87 9
MARITIME PROVINCES .....	109	90	12	7	88 1
TOTAL .....	572	469	71	41	86 6

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from all observing stations are used.

The daily probabilities and storm warnings were issued by Probability Officer B. C. Webber.

### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR FEBRUARY, 1895.

Mean westerly declination.....	4° 45' 7
Increase from February, 1894.....	5' 4
Mean horizontal force.....	0° 106 25
Mean vertical force.....	0° 603 40

On the 1st the declination magnet was slightly disturbed while the force magnets were quiet. The same thing occurred on the 2nd, the most marked movement occurring shortly after 23<sup>h</sup> (Toronto mean time), when in 17 minutes the needle moved 10' to the eastward. The 3rd and 4th were quiet days. After 0<sup>h</sup> 40<sup>m</sup> of 4th and at intervals up to 10<sup>h</sup> of 6th the declination was slightly disturbed; the only bifilar movement worthy of note, and even this was small, occurred during half an hour beginning at 0<sup>h</sup> 14<sup>m</sup> of 6th. A slight disturbance of the declination magnet during the early part of the 7th became much more pronounced at 22<sup>h</sup> and continued until 6<sup>h</sup> of the 8th, the greatest departure west of the mean position was 7' and east of mean position 13'; during the same time the force magnets were slightly disturbed but there were no marked departures from mean positions. Between 4<sup>h</sup> 9th and 5<sup>h</sup> 10th, all magnets were disturbed, particularly the declination; the most pronounced deflection of the magnet, 24' in 7 minutes, occurred at 3<sup>h</sup> 49<sup>m</sup>

10th, and the greatest easterly  $31'7''$  at  $19^h$ , 9th. Beginning at  $16^h 50^m$ , 9th, the horizontal component sharply increased  $0'0013$ , C.G.S., and the vertical increased  $0'0016$ , both returning to normal in a few minutes and again at  $17^h 36^m$  the former increased  $0'0010$  and the latter  $0'0013$ ; the highest bifilar reading occurred at  $16^h 55^m$  and the lowest at  $23^h 40^m$ ; the highest vertical force reading occurred at  $0^h 53^m$ , 10th, and the lowest at  $16^h 55^m$ , 9th. On the 10th, between  $17^h$  and  $18^h 23^m$  there was a sharp easterly movement of the declination needle, the greatest amplitude being at  $17^h 47^m$ , and between  $22^h 17^m$  and  $23^h 03^m$  a westerly movement of  $15'$ , the greatest amplitude occurring at  $22^h 38^m$ , the force magnets showed no disturbance on this day. The 11th and 12th were quiet days. During the early morning of the 13th and again during most of the 14th the declination was slightly disturbed while the force magnets were quiet.

On the 15th at  $0^h 50^m$  a declination disturbance began and lasted until  $4^h$ , 18th, the force magnets the while showing but slight disturbance at intervals, the most marked features of this disturbance were:—On 15th a sharp easterly swing of  $22'$  between  $20^h 6^m$  and  $20^h 18^m$ , on 16th another sharp easterly swing of  $22'$  between  $22^h 50^m$  and  $23^h$ ; on the 15th the greatest westerly declination,  $5^\circ 5'$ , occurred at  $1^h 30^m$ , and the least,  $4^\circ 16'$  at  $20^h 50^m$ ; on the 16th the greatest,  $4^\circ 58'$  at  $12^h 58^m$ , and the least,  $4^\circ 26'$ , at  $23^h 15^m$ ; on the 17th the greatest,  $4^\circ 50'$ , at  $24^h 22^m$ , and the least,  $4^\circ 29'$ , at  $22^h 47^m$ .

From the early morning of the 18th until the evening of the 23rd the magnets were quiet. After  $21^h$ , 23rd, the declination was slightly disturbed, at  $1^h 23^m$ , 24th, the needle began to move west, 12 minutes later it had moved  $16'$  and by  $1^h 53^m$  had returned to its former position. All magnets were slightly disturbed on the 24th between  $9^h$  and  $11^h$ .

The next disturbance, which was also slight, occurred between  $23^h$ , 27th, and  $4^h$ , 28th, the greatest departure of the needle east of the mean position,  $14'5''$ , occurred at  $23^h 50^m$  and the greatest departure west of mean position,  $6'3''$ , at  $22^h 23^m$ .

On the 14th, 15th and 23rd auroral light was observed. On 2nd, 4th, 5th, 6th, 16th, 18th, 25th and 26th the sky was clear but no aurora was observed, on all other nights clouds or haze would have hidden any aurora which may have existed.

R. F. STUPART,

*Director.*

METEOROLOGICAL OFFICE.

Toronto, May 23rd, 1895.





## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

MARCH, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SYNOPSIS OF THE WEATHER.

The distribution of pressure during the month was as much as 100 to 150 of an inch below the mean over the Maritime Provinces, Eastern Quebec and Newfoundland. West of this it increased, till over the greater portion of Southern Ontario it was normal. Further west, from Lake Superior to British Columbia it was from normal to 1050 of an inch below. The mean rate of travel of depressions was 33.4 miles per hour. They moved fairly direct in their course, excepting one, which towards the end of the month took an erratic path over the Middle States.

1st to 4th. Cyclonic conditions were general throughout Canada on the 1st, fair, moderately cold weather prevailed in the Northwest, light snow was falling in Ontario, whilst further east it was generally showery.

An anti-cyclone quickly spread over the Northwest on the 2nd, extending next day to the Lakes, with fine cold weather, and during the night these conditions obtained throughout Eastern Canada, the temperature generally falling below zero in Northern Ontario and in Quebec, the lowest minimum being 31° below zero in the District of Algoma.

On the 4th a depression, which had come from the Western States, developed on reaching the Lower Lakes, causing a general snowfall and high N.E. and N.W. winds. It passed quickly north-eastward to the Maritime Provinces and gave a general snowfall throughout Eastern Canada.

5th to 10th. On the 5th pressure was about or a little above normal everywhere, and the weather had become generally fair. This was soon succeeded by a depression appearing over the Northwest, giving light local snowfalls there. The weather otherwise continued fair everywhere until the 8th, when this depression, with increased energy, had moved to the Lakes. By night of this day a general decrease of pressure had taken place everywhere, and a moderate snowfall with strong westerly winds prevailed over Ontario. Next day snow or rain was falling in the Maritime Provinces, but these cyclonic conditions soon passed off the coast and were followed on the 10th by higher pressure and fair cold weather everywhere.

11th to 16th. With the exception of light local snowfalls and more moderate temperature in the Lake district, the weather continued fine and cold everywhere. An important anti-cyclone had set in over the Northwest on the 11th, and the temperature fell considerably below zero at most places, Winnipeg having a minimum of 33° below zero on the 13th.

A slight depression, which had caused the snowfall in Ontario, moved eastward on the 14th, giving a moderate snowfall in Quebec and rain or snow in the Maritime Provinces, also strong winds.

The anti-cyclone soon spread eastward, and on the 15th high pressure and fine, decidedly cold weather, were general.

This was however of short duration, for by night a quick change to lower pressure took place over the Lakes and Eastern Canada: light snow set in in these districts, and on the 16th a fairly well defined depression was shewn central off the New England coast.

17th to 26th. After the 16th cyclonic conditions continued over Eastern Canada, and the weather, from the Lakes to the Atlantic, was generally fair and moderately cold, with strong westerly winds and occasional light local snowfalls.

In the Northwest high pressure prevailed with fine weather. This high pressure spread to the Lakes on the 19th, and then eastward, fine moderately cold weather being general from the Lakes to the Atlantic until the night of the 23rd. A depression had appeared over the Northwest on the 20th and the temperature rose considerably, especially in Alberta, the maxima being  $50^{\circ}$  at Calgary,  $58^{\circ}$  at Medicine Hat,  $52^{\circ}$  at Edmonton,  $44^{\circ}$  at Qu'Appelle,  $42^{\circ}$  at Minnedosa and  $42^{\circ}$  at Winnipeg. This depression passed to the north of the Lakes on the 24th crossing over Labrador on the 26th. It caused a fall of rain everywhere from the Lakes to the Atlantic, and high temperatures, the maxima being on the 24th,  $50^{\circ}$  at Toronto,  $49^{\circ}$  at Parry Sound and  $54^{\circ}$  at Rockliffe. Next day the temperature rose to  $44^{\circ}$  at Kingston,  $41^{\circ}$  at Montreal,  $44^{\circ}$  at Quebec and  $50^{\circ}$  at Chatham; and on the 26th the maxima were  $45^{\circ}$  at Yarmouth, N.S.,  $50^{\circ}$  at Halifax and  $43^{\circ}$  at Charlottetown.

27th to 31st. Another depression which moved quickly across the Northwest on the 26th, reached the Lakes on the 27th, where it gave a moderate snowfall. From thence it moved due east and on the morning of the 28th was central off the New England coast. It then developed considerable energy and passed over Newfoundland on the 29th. It gave a strong N. to W. gale throughout the Maritime Provinces and heavy snow in Nova Scotia. An anti-cyclone passed over the Northwest on the 27th, with fine moderately cold weather, and soon followed the last depression, being over the Lakes on the 28th. There it developed considerable energy and spread on the 31st to Quebec, and the weather cleared up everywhere, with lower temperature in Quebec and the Maritime Provinces. But Southwestern Ontario was somewhat affected on the 30th and 31st by a depression to the southwest of the Lakes causing a light fall of snow turning to rain there. Lower pressure followed the anti-cyclone which had passed over the Northwest on the 27th, and was the cause of local falls of rain or snow there. It was succeeded on the 30th by higher pressure and comparatively mild weather: these conditions continuing until the end of the month.

#### TEMPERATURE.

The temperature in British Columbia was about the average; when compared with 1894, it was in general  $2^{\circ}$  to  $3^{\circ}$  warmer. In the Northwest Territories and Manitoba it was from  $2^{\circ}$  to  $3^{\circ}$  above the average.

In Ontario it was from  $3^{\circ}$  to  $6^{\circ}$  below the average, the coldest being in the northern and southwest districts.

In Quebec it was from  $1^{\circ}$  to  $3^{\circ}$  below, and in the Maritime Provinces and P. E. Island it was slightly lower in New Brunswick and did not differ much from the average in Nova Scotia.

*The Highest and Lowest Temperatures in each Province during March were:*

British Columbia,  $70^{\circ}0$  on 28th at Princeton,  $-22^{\circ}1$  on 13th at Stuart's Lake.

North-west Territories,  $67^{\circ}0$  on 28th at Medicine Hat,  $-33^{\circ}5$  on 11th at Oonikup.

Manitoba,  $56^{\circ}3$  on 26th at Brandon,  $-35^{\circ}4$  on 13th at Brandon.

Ontario,  $61^{\circ}0$  on 24th at Cottam,  $-41^{\circ}9$  on 10th at White River.

Quebec,  $40^{\circ}1$  on 25th at Chicoutimi,  $-25^{\circ}3$  on 11th at Chicoutimi.

New Brunswick,  $50^{\circ}4$  on 25th at Chatham,  $-14^{\circ}5$  on 7th at Chatham.

Nova Scotia,  $53^{\circ}8$  on 24th at New Glasgow,  $0^{\circ}0$  on 7th at Sydney.

Prince Edward Island,  $45^{\circ}0$  on 25th at Georgetown,  $1^{\circ}8$  on 19th at Georgetown.







## PRECIPITATION.

The rainfall, with the single exception of British Columbia, has been much below the average, in some provinces the amount has been only one-fourth to one-half the usual quantity.

*The general distribution has been as follows :—*

In BRITISH COLUMBIA the general average was 3·10 in., or about one inch more than usual.

In the NORTHWEST TERRITORIES rain fell at a few stations to an inconsiderable amount.

In MANITOBA rain was pretty general, but only to about one-fourth of the average.

In Ontario, West and South-west District, it was 0·45 in., or 1·32 in. below the average. In the North and North-west District, it was 0·21 in., or 0·78 in. below the average. In the Central District, it was 0·77 in., or 0·64 in. below the average. And in the East and North-east District it was 0·21 in., or 0·77 in. below the average.

In Quebec it was 0·17 in., or 0·64 in. below the average.

In New Brunswick it was 1·33 in., or 0·61 in. below the average.

In Nova Scotia it was 2·34 in., or 0·17 in. below the average.

In Prince Edward Island it was 0·49 in., or 1·40 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA—Union, 8·72 in. ; Beaver Creek, 11·35 in. ; Loch Erroch, 5·66 in. ; Goldstream Lake, 5·29 in. ; Abbotsford, 5·37 in. ; Sproat Lake, 11·67 in. ; Rivers Inlet, 8·00 in.

NEWFOUNDLAND, St. Johns, 8·01 in.

BERMUDA—Prospect, 5·26 in.

*Rain 1 in. and upwards in 24 hours :—*

8. Whitehead, 1·14 in. ; Yarmouth, 1·00 in. ; Halifax, 1·30 in.

9. St. Johns, 1·02 in.

12. Bermuda, 1·82 in.

14. Point Lepreaux, 1·85 in. ; Grand Manan, 1·43 in. ; St. Andrews, 1·45 in. ; Halifax, 1·10 in. ; St. John, 1·14 in.

17. St. Johns, 1·72 in. ; Bermuda, 1·08 in.

19. Beaver Creek, 3·34 in. ; Union, 1·90 in. ; Sproat Lake, 2·26 in. ; River Inlet, 1·12 in.

20. Sproat Lake, 1·96 in.

24. Presque Isle, 1·25 in.

25. Beaver Creek, 1·55 in. ; Sproat Lake, 1·00 in. ; Elora, 1·25 in. ; River Inlet, 1·38 in.

26. Orangeville, 1·10 in. ; Loch Erroch, 1·30 in. ; Union, 1·11 in. ; Abbotsford, 1·20 in.

27. Orangeville, 2·15 in. ; Loch Erroch, 2·00 in. ; Beaver Creek, 1·82 in. ; Union, 1·33 in. ; Sproat Lake, 2·20 in. ; Canobie, 1·38 in. ; Abbotsford, 1·18 in. ; Langley, 1·17 in. ; Quamichan (2), 1·25 in.

28. Sproat Lake, 1·26 in.

29. St. Johns, 1·02 in.

27. New Westminster, 1·26 in.

The snowfall, with the exception of Prince Edward Island and part of Nova Scotia, has been below the average.

*The distribution is as follows :*

In BRITISH COLUMBIA in some parts of the interior little has fallen ; in other sections, and on the coast, some exceptionally large amounts are recorded.

In NORTHWEST TERRITORIES about 2 in. has fallen, or about one fourth that of 1894.

In MANITOBA 2·0 in. has fallen, or about one-fourth of the average.

In the DISTRICTS OF ONTARIO the amount is 0·7 in., or 8·1 in. below the average ; 11·5 in., or 10·4 in. below the average ; 8·5 in., or 14·3 in. below the average ; 13·5 in., or 7·4 in. below the average,

In QUEBEC 8·9 in., or 10·4 in. below the average.

In NEW BRUNSWICK 11·3 in., or 0·7 in. below the average.

In PRINCE EDWARD ISLAND 16·1 in., or 2·6 in. above the average.

*Snowfall 10 inches and upwards during month :—*

BRITISH COLUMBIA.—Rivers Inlet, 19 in. ; Glacier, 30 in. ; Stuart Lake, 11 in.

ONTARIO.—Chatham, 11 in. ; Point Clark, 11 in. ; Birnam, 13 in. ; Haliburton, 12 in. ; Sprucedale, 18 in. ; Uplands, 23 in. ; Gravenhurst, 12 in. ; Beatrice, 16 in. ; Bognor, 13 in. ; Orillia, 14 in. ; Whiteside, 11 in. ; Durham, 28 in. ; Stony Creek, 11 in. ; Bancroft, 24 in. ; Thorold, 15 in. ; Trenton, 12 in. ; Lakefield, 16 in. ; Peterborough, 15 in. ; Galt, 10 in. ; Burk's Falls, 16 in. ; Missanabie, 18 in. ; Biscotasing, 12 in. ; Schreiber, 33 in. ; Midland, 11 in. ; Denbigh, 21 in. ; Wilton Grove, 11 in. ; Thedford, 11 in. ; Blenheim, 12 in. ; Georgetown, 11 in. ; Princeton, 12 in. ; Mount Forest, 14 in. ; Wiarton, 14 in. ; Sunshine, 13 in. ; St. Thomas, 10 in. ; Oliver's Ferry, 12 in. ; Goderich, 16 in. ; Parry Sound, 21 in. ; Lindsay, 15 in. ; Coldwater, 12 in.

QUEBEC.—Anticosti, W.P., 20 in. ; Anticosti, S.W.P., 23 in. ; Grindstone, 30 in.

NEW BRUNSWICK.—Fredericton, 18 in. ; Grand Manan, 13 in. ; Chatham, 12 in. ; Dalhousie, 10 in. ; Point Escuminac, 19 in. ; Bathurst, 11 in.

NOVA SCOTIA.—Halifax, 23 in. ; Truro, 14 in. ; New Glasgow, 29 in. ; Truro, 14 in. ; Sydney, 12 in. ; Yarmouth, 19 in. ; Pictou, 47 in. ; Whitehead, 12 in.

PRINCE EDWARD ISLAND.—Charlottetown, 14 in. ; Georgetown, 18 in.

*Snowfall 3 in. and upwards in 24 hours:—*

2. Calgary, 3 in. ; Fort Steele, 4 in. ; Heron Bay, 4 in.

3. Point Clark, 3 in. ; Brantford, 9 in. ; Halifax, 4 in.

4. Channell, 4 in. ; St. Thomas, 6 in. ; Glastonbury, 3 in. ; Aurora, 3 in. ; Cowal, 4 in. ; Princeton, 6 in. ; Georgetown, 4 in. ; Blenheim, 8 in. ; Thedford, 4 in. ; Raleigh, 4 in. ; Saugeen, 4 in. ; Parry Sound, 3 in. ; Port Stanley, 10 in. ; London, 7 in. ; Deseronto, 4 in. ; Stratford, 4 in. ; Lindsay, 4 in. ; Haileybury, 3 in. ; Ottawa, 5 in. ; Durham, 4 in. ; Port Dover, 5 in. ; Wilton Grove, 8 in. ; Denbigh, 4 in. ; Midland, 3 in. ; Coldstream, 5 in. ; Oliver's Ferry, 4 in. ; Wyoming, 7 in. ; Huntsville, 5 in. ; Goderich, 6 in. ; Whitehead, 6 in. ; Chatham, 9 in. ; Galt, 5 in. ; Peterborough, 5 in. ; Birnam, 8 in. ; Alton, 4 in. ; Trenton, 3 in. ; Thorold, 9 in. ; St. Marys, 4 in. ; Cottam, 4 in. ; St. Hyacinthe, 6 in. ; Stony Creek, 6 in. ; Stouffville, 4 in. ; Bognor, 3 in. ; Welland, 5 in. ; Orillia, 3 in. ; Elora, 3 in. ; Glacier, 4 in. ; Port Morien, 3 in. ; Clontarf, 3 in.

5. Duck Lake, 3 in. ; Point Lepreaux, 3 in. ; Dalhousie, 3 in. ; Richmond, 6 in. ; Point Escuminac, 5 in. ; Cape Magdalen, 5 in. ; DeCewsville, 4 in. ; Sarnia, 6 in. ; Beatrice, 3 in. ; St. George, 4 in. ; Paris, 6 in. ; Bancroft, 6 in. ; Grand Manan, 3 in. ; Halifax, 5 in. ; Duck Lake, 3 in.

6. Hillview, 3 in. ; Barelay, 4 in. ; Parry Sound, 4 in.

7. Wiarton, 4 in. ; Mount Forest, 3 in. ; Grand Manan, 6 in.

8. Dalhousie, 3 in. ; Thedford, 3 in. ; Midland, 3 in. ; Point Clark, 3 in. ; Sprucedale, 4 in. ; Schreiber, 3 in. ; Spence, 4 in. ; Burk's Falls, 4 in. ; Elora, 4 in. ; Saugeen, 4 in. ; Port Stanley, 3 in. ; Durham, 4 in. ; Goderich, 5 in.

9. Sunshine, 4 in. ; Wiarton, 4 in. ; Presque Isle, 3 in. ; Point Escuminac, 5 in. ; Midland, 4 in. ; Sprucedale, 3 in. ; Schreiber, 12 in. ; Lucknow, 3 in. ; Orillia, 4 in. ; Parry Sound, 5 in. ; Stratford, 4 in. ; Coldwater, 7 in. ; Durham, 6 in. ; Spence, 3 in. ; Burk's Falls, 3 in. ; Bancroft, 4 in. ; St. Johns, 3 in. ; Saugeen, 4 in. ; Anticosti, W.P., 3 in. ; Biscotasing, 3 in. ; Point Clark, 5 in. ; Cartier, 3 in. ; Trenton, 3 in.

10. Sunshine, 4 in. ; Thedford, 3 in. ; Beatrice, 3 in. ; Whiteside, 3 in. ; Uplands, 3 in. ; Port Simpson, 4 in.

11. Calgary, 3 in. ; Missanabie, 5 in. ; Glacier, 3 in.

12. Missanabie, 3 in.

14. Point Escuminac, 6 in. ; Anticosti, W.P., 4 in. ; Point des Monts, 6 in. ; Bathurst, 5 in.

15. Pictou, 3 in. ; Channell, 7 in.

16. Pictou, 8 in. ; Point Lepreaux, 3 in. ; Channell, 5 in. ; Point Escuminac, 3 in. ; Anticosti, W.P., 5 in. ; Georgetown, P.E.I., 4 in. ; St. Andrew's, 3 in. ; Charlottetown, 4 in. ; Halifax, 3 in.

17. Grindstone, 4 in.

18. Grindstone, 3 in. ; Truro, 4 in.

19. Anticosti, W.P., 5 in. ; Georgetown, P.E.I., 4 in.

20. Glacier, 6 in.

21. Barkerville, 3 in. ; Glacier, 4 in. ; St. Johns, 6 in.

22. Abbotsford, 4 in. ; Glacier, 4 in.

23. Nepigon, 3 in. ; Langley, 4 in. ; Port Arthur, 3 in. ; Rivers Inlet, 15 in.

24. Schreiber, 4 in. ; Stony Mountain, 3 in.

26. Mount Forest, 4 in. ; Durham, 4 in.

27. Channell, 3 in.; Ennismore, 4 in.; Oliver's Ferry, 6 in.; Biscotasing, 4 in.; Peterborough, 3 in.; Schreiber, 3 in.; Missanabie, 6 in.; Burk's Falls, 3 in.; Renfrew, 3 in.; Barkerville, 4 in.; Bancroft, 4 in.; Ottawa, 3 in.

28. New Glasgow, 18 in.; Port Hastings, 3 in.; Denbigh, 4 in.; Brockville, 3 in.; Uplands 6 in.; Trenton, 3 in.; Clontarf, 5 in.; Yarmouth, 11 in.; Sydney, 3 in.; Halifax, 4 in.

29. Pictou, 30 in.; Channell, 5 in.; Denbigh, 5 in.; Thompson, 4 in.; Whitehead, 6 in.; Nepigon, 3 in.; Sprucedale, 5 in.; Schreiber, 3 in.; Georgetown 6 in.; Bancroft, 4 in.; Uplands, 5 in.; Grindstone, 7 in.; Yarmouth, 3 in.; Halifax, 3 in.; Port Arthur, 4 in.; Truro, 6 in.

30. Brockville, 3 in.; Barclay, 4 in.; Burk's Falls, 3 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Channel Island, IV; Sault Ste. Marie, Alameda, Gravenhurst, IV; Portage la Prairie, Hillview, IV; St. Albans, II; Channell, IV; Minnedosa, II; Prince Albert, I; Haileybury, IV; Fredericton, IV; Moose Jaw, IV.

2. Chicoutimi, Portage la Prairie, Georgetown, IV; St. Albans, II.

3. Clontarf, IV; Sault Ste. Marie, Portage la Prairie, Pembina Crossing, II; Shoal Lake, IV; Minnedosa, III; White River, III; Haileybury, III.

5. Fort Steele, IV; Portage la Prairie, Hillview, IV; Pembina Crossing, III.

7. Chicoutimi, Donald.

8. Chicoutimi.

10. Kuper Island, B.C., III.

11. Prince Albert, II.

12. Prince Albert, II; Saskatoon, IV.

13. Moose Jaw, IV; Donald, Elora, Fort Steele, IV; Hillview, IV; Treherne, II; Quebec, II; Channell, IV; Minnedosa, III; Medicine Hat, III; Grindstone, III; Truro, IV; Yorkton, II; Henrietta, I; Saskatoon, III; Moose Jaw, IV; Anticosti, E.P., Cape Magdalen.

14. Bancroft, IV; Clontarf, IV; Channel Island, III; Chicoutimi, III; Moose Jaw, IV; Gravenhurst, III; Donald, Elora, Spence, I; Virgil, IV; Bognor, III; Stouffville, IV; Lucknow, III; Stony Creek, IV; Beatrice, IV; Savanne, Sprucedale, Point Clark, IV; Cape Norman, III; Hillview, III; Georgetown, IV; Pembina Crossing, II; Belmont, Treherne, III; Cartwright, Richmond, I; St. Albans, II; Dalhousie, N.B., Minnedosa, I; Prince Albert, I; Medicine Hat, III; Qu'Appelle, III; Father Point, II; Quebec, IV; St. Andrews, Port Stanley, IV; Rockcliffe, Kingston, III; Stratford, II; Haileybury, II; Ottawa, IV; Yorkton, I; Henrietta, I; Saskatoon, II; Chaplin, II; Moose Jaw, IV; Cape Magdalen, Emerson, II.

15. Clontarf, IV; Channel Island, IV; Chicoutimi, IV; Sault Ste. Marie, Alameda, III; Roseberry, Portage la Prairie, Hillview, III; Pembina Crossing, III; Treherne, IV; Cartwright, St. Albans, III; Minnedosa, II; Grindstone, III; Father Point, II; Quebec, III; Rockcliffe, Haileybury, III; Truro, III; Henrietta, II; Saskatoon, IV; Moose Jaw, III; Emerson, III.

16. Chicoutimi, IV; Sault Ste. Marie, Moose Jaw, IV; Gravenhurst, IV; Spence, I; Welland, IV; Bognor, IV; Stony Creek, IV; Savanne, Trenton, Portage la Prairie, Hillview, II; Georgetown, IV; Pembina Crossing, IV; Treherne, II; St. Albans, III; Dalhousie, N.B., Minnedosa, II; Prince Albert, I; Medicine Hat, II; Stratford, II; Qu'Appelle, III; Father Point, II; Quebec, IV; Port Arthur, II; Rockcliffe, Kingston, III; Haileybury, III; Ottawa, IV; Henrietta, I; Saskatoon, II; Chaplin, II; Moose Jaw, IV; Toronto, IV; Emerson, III.

17. Chicoutimi, III; Sault Ste. Marie, Moose Jaw, IV; Roseberry, Gravenhurst, IV; St. Ann's, IV; Georgina, II; Portage la Prairie, Hillview, IV; Pembina Crossing, Treherne, III; White River, III; Father Point, IV; Port Arthur, II; Haileybury, IV; Truro, IV; Saskatoon, IV.

18. Sault Ste. Marie, Moose Jaw, IV; Savanne, Portage la Prairie, Hillview, III; Truro, IV; Treherne, III; Minnedosa, II; Kingston, I; Haileybury, IV; Saskatoon, IV.

19. Roseberry, Savanne, Portage la Prairie, Hillview, IV; Pembina Crossing, IV; Treherne, IV; Haileybury, III.

20. Clontarf, IV; Roseberry, Gravenhurst, IV; Georgetown, P.E.I., Savanne, Portage la Prairie, Hillview, IV; Midland, II; Georgetown, IV; Pembina Crossing, II; Shoal Lake, IV; Father Point, III; Quebec, III; St. Andrews, IV; Haileybury, III; Fredericton, IV; Truro, IV; Henrietta, III; Saskatoon, IV.



21. Moose Jaw, IV; Gravenhurst, IV; Savanne, Sprucedale, Birnam, IV; Hillview, III; Georgetown, IV; Pembina Crossing, II; Shoal Lake, III; White River, III; Haileybury, IV; Truro, IV; Saskatoon, IV; Moose Jaw, III; Durham.

22. Clontarf, IV; Chicoutimi, Gravenhurst, IV; Welland, II; Lucknow, IV; Savanne, Sprucedale, Georgina, IV; Cape Norman, III; Georgetown, IV; Pembina Crossing, Richmond, I; Dalhousie, N.B., Minnedosa, II; Grand Manan, IV; Grindstone, III; Father Point, III; Quebec, III; St. Andrews, Kingston, I; Haileybury, III; Truro, IV; Saskatoon, IV; Cape Magdalen, Burk's Falls, III; Anticosti, S.W.P., III; Montreal.

23. Chicoutimi, IV; Roseberry, Hillview, III; Pembina Crossing, IV; White River, IV; Father Point, III; Saskatoon, IV.

24. Alameda, III; Moose Jaw, IV; Sable Island, Portage la Prairie, Cape Norman, II; Hillview, IV; Pembina Crossing, III; Belmont, Treherne, II; St. Albans, II; Minnedosa, IV; Father Point, IV; Truro, IV; Henrietta, I; Saskatoon, IV; Moose Jaw, II; Chaplin, III.

25. Gravenhurst, IV; Sable Island, Portage la Prairie, Hillview, IV; White River, II; Pembina Crossing, IV; Shoal Lake, II; Treherne, IV; Minnedosa, IV.

26. Portage la Prairie, Pembina Crossing, IV; Treherne, IV; Minnedosa, IV.

27. Moose Jaw, Savanne, Portage la Prairie.

28. White River, III; Haileybury, IV; Henrietta, III; Toronto, IV.

29. Chicoutimi, Roseberry, Pembina Crossing, IV; Medicine Hat, II; Quebec, IV; Haileybury, II.

30. Chicoutimi, Cape Norman, II; Medicine Hat, II; Quebec, IV; St. Andrews, Haileybury, Henrietta, III.

31. Channel Island, IV; Moose Jaw, Hillview, III; Treherne, II; Battleford, II; Henrietta, III.

#### APPEARANCE OF SPRING BIRDS, &c.

CROWS.—Richmond, 10th; Oonikup, 22nd; Stuart Lake, 18th; Portage la Prairie, 30th; Moose Jaw, 22nd; Roseberry, 28th; Collingwood, 20th; Whiteside, 11th; Orillia, 12th; Bognot, 5th; Beatrice, 8th; Treherne, 25th; Shoal Lake, 23rd; Presque Isle, 1st; Georgetown, 30th; Midland, 8th; Gravenhurst, 12th; St. Mary's, 13th; Sprucedale, 6th; Haliburton, 7th; Georgina, 1st; Brome, 7th; Savanne, 25th; Peterborough, 2nd; Clontarf, 19th; Stony Creek, 1st; Renfrew, 15th.

BUTTERFLIES.—Hazlemere, 9th.

ROBINS.—Toronto, 23rd; Minnedosa, 31st; Stratford, 7th; Spence's Bridge, 4th; Canobie, 1st; Beaver Creek, 7th; Pembina Crossing, 30th; Cowal, 24th; Paris, 12th; Princeton, 24th; Georgetown, 30th; Thedford, 30th; Midland, 13th; Stouffville, 27th; Conestogo, 25th; DeCewsville, 28th; Stony Creek, 1st; Lucknow, 25th; Elora, 17th; Gravenhurst, 18th; Birnam, 22nd; Point Clark, 29th; Owen Sound, 31st; London, 10th.

PLOVER.—Pembina Crossing, 26th.

BLUE BIRDS.—DeCewsville, 31st; Peterborough, 30th; Stony Creek, 23rd; Elora, 27th; Point Clark, 19th.

SONG SPARROW.—Cowal, 26th; Minnedosa, 17th.

MEADOW LARK.—Loch Erroch, 5th; Pincher Creek, 14th; Pembina Crossing, 31st; Treherne, 6th; Ottawa, 6th; Spence's Bridge, 4th.

GROUSE.—Canobie, 14th; Morden, 26th.

BLACK BIRDS.—Moose Jaw, 31st; DeCewsville, 23rd; Paris, 15th; St. Mary's, 24th; Georgina, 31st; Birnam, 21st; Oonikup, 30th.

DUCKS.—Brandon, 25th; Pincher Creek, 27th; Moose Jaw, 22nd; Hillview, 28th; Rathwell, 27th; Pembina Crossing, 26th; Treherne, 27th; Pilot Mound, 25th; Rosebank, 29th; Henrietta, 27th; Chaplin, 17th; Peterborough, 2nd; Cottam, 19th.

WILD GEESSE.—Canobie, 27th; Salmon Arm, 8th; Beaver Creek, 6th; Portage la Prairie, 31st; Brandon, 29th; Pincher Creek, 27th; Alameda, 21st; Moose Jaw, 20th; Hillview, 19th; Roseberry, 18th; Morden, 23rd; Rathwell, 27th; Pembina Crossing, 18th; Treherne, 20th; Rosebank, 29th; Norquay, 21st; Henrietta, 27th; Chaplin, 11th; Midland, 24th; Cottam, 21st; Pilot Mound, 25th; Ennismore, 22nd; Stony Creek, 25th; Toronto, 22nd; Shoal Lake, 13th; Oonikup, 26th.

SWALLOWS.—Sproat Lake, 26th; Canobie, 31st; Moose Jaw, 27th.

HUMMING BIRD.—Sproat Lake, 25th.

FROGS.—Alameda, 30th.

HOURS ENDING															
5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON.	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUEMAULT .....	..	..	0 03	0 41	0 56	0 58	0 59	0 53	0 53	0 47	0 51	0 44	0 27	0 01	..
KUPER Island.....	..	..	..	07	35	40	45	45	46	51	43	35	16	8	..
AGASSIZ, B. C. ....	..	..	8	14	37	41	50	48	45	35	27	20	05	..	..
INDIAN HEAD.....	..	..	..	02	24	18	62	64	52	46	43	24	05	..	..
BRANDON.....	..	..	02	31	65	75	75	78	81	75	75	74	55	09	..
WINNIPEG.....	..	..	20	49	68	78	78	77	75	72	68	53	08	..	..
WOODSTOCK.....	..	..	8	17	37	54	60	64	61	52	49	46	27	02	..
TORONTO.....	..	..	21	55	06	68	67	69	64	59	55	53	51	18	..
LINDSAY.....	..	..	15	34	42	51	57	61	59	59	55	48	44	41	13
BABIE.....	..	..	07	31	53	62	60	60	56	56	56	55	51	24	..
KINGSTON.....	..	..	24	50	57	68	65	70	69	65	62	55	44	13	..
MONTREAL.....	..	..	09	44	59	71	67	63	64	64	64	68	45	01	..
FREDERICTON.....	..	..	20	49	53	56	55	59	54	50	46	45	45	23	..

	ESQUIMT.	KUPER ISLAND.	AGASSIZ.	INDIAN HEAD.	BRANTON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LENSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.41	0.33	0.57	0.31	0.57	0.69	0.39	0.54	0.48	0.48	0.54	0.59	0.46
MAXIMUM DAILY AMOUNT .....	0.87	0.89	0.77	0.71	0.86	0.96	0.80	0.95	1.00	0.93	0.94	0.98	0.93
DATE .....	5 13	13	5	5	11	3	19	19	19	19	22	30	11
NO. OF DAYS COMPLETELY CLOUDED.....	4	5	7	8	1	3	6	3	6	15	12	3	4

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	84	61	11	12	79.2
LOWER LAKE REGION .....	106	66	17	23	70.3
UPPER ST. LAWRENCE .....	99	78	15	6	86.4
LOWER ST. LAWRENCE .....	97	71	14	12	80.4
GULF .....	96	78	10	8	86.5
MARITIME PROVINCES .....	104	68	21	15	75.5
TOTAL .....	586	422	88	76	79.5

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

10

## STORM WARNINGS.

During the month warnings on the approach of 4 storms were issued to our agents, and cautionary signals displayed at the various signal stations. The total number of warnings issued was 54, of which 45 were verified. At 4 stations, however, the force exceeded, and at 9 did not reach that indicated by the signals. 2 stations reported warnings late owing to issue.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 54 warnings verified as to force, 31 or 67·3 per cent were fully, and 45 or 100 per cent were fully and partially verified as to direction.

1. At 11.40 a.m. on the 4th, Nova Scotia and Fundy were warned for a fresh to heavy E., then N. to N.W. gale, and the same night, at 10.15 p.m., Cape Breton stations were notified to expect a moderate easterly gale. The warnings were issued on the approach of a moderate depression in its eastward advance across the continent. During the night of the 4th a moderate east to south gale prevailed over the districts warned, but at no place apparently did it reach the force of a fresh or strong gale. Signals were lowered at 10.45 a.m. on the 5th.

2. At 3.44 p.m. on the 8th, Gulf and Ocean were warned for a moderate easterly gale, and afterwards, during the night of the 9th, Sydney reported that a strong gale prevailed, Louisburg a heavy gale, and Liscomb a light gale, but at all other stations no storm seems to have occurred. Signals were lowered at 10.30 a.m. on the 10th.

3. Gulf and Ocean were warned at 10.15 p.m. on the 13th for a moderate easterly storm and the following morning signal No. 4, for a fresh to heavy gale, was substituted for the cones, as the disturbance for which the warnings were issued was gaining more energy in its eastward advance. During the evening and night of the 14th, a gale prevailed very generally throughout the districts warned. Glace Bay reported that a fresh northeast gale prevailed, and Liverpool a strong northwest gale. Signals were lowered at 10.05 p.m. on the 14th.

4. At 10.35 a.m. on the 28th, Gulf and Ocean were warned for a fresh to heavy E., through N. to N.W. gale, an important and developing storm being then centered over Massachusetts, and afterwards, during the afternoon and night of the 28th, as it swept over the Maritime Provinces, a heavy gale from the directions indicated was everywhere recorded, together with a fall of snow, which latter in some localities was exceptionally heavy. Yarmouth reports snowstorm was remarkable, great damage to all electric wires, as well as to trees, by snow and wind. Signals were lowered at 11.45 on the 29th.

### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR MARCH, 1895.

Mean westerly declination.....	4° 44'·6
Mean horizontal force.....	0·16642
Mean vertical force.....	0·60303

During the first six days of the month the declination magnet was at intervals, particularly during the nights, slightly disturbed, while the force magnets showed no movement worthy of note. On the 8th both the horizontal force and declination magnets were at times slightly disturbed, the latter particularly so during the evening. The 9th, 10th, 11th and 12th were quiet days. At 0<sup>h</sup> 45<sup>m</sup>, 13th, magnets became slightly disturbed and continued so until the morning hours of the 15th, the horizontal component showed no marked departures from normal, but the declination trace shows several considerable changes, notably one beginning at 21<sup>h</sup> 44<sup>m</sup>, 13th, when the magnet moved 20' east, and then between 22<sup>h</sup> 20<sup>m</sup> and 22<sup>h</sup> 55<sup>m</sup> moved 34' to the westward, and again at 16<sup>h</sup> 35<sup>m</sup>, 14th, when there was an easterly swing of 25'. The declination was slightly disturbed on 15th, 16th and 17th, especially during the afternoons and evenings, after which there was no irregularity noted until the early morning of the 26th, when during 32 minutes there was a westerly movement of the declination needle of 21' and a return to normal in about the same interval. The needle was again slightly disturbed during the 30th and 31st.

Aurora, class IV, was observed on the 16th, at midnight bright auroral light with faint streamers, and on the 28th appearance of auroral light at 22<sup>h</sup> 30<sup>m</sup>. On the 1st, 2nd, 3rd, 4th, 6th, 7th, 10th, 11th, 14th, 17th, 18th, 19th, 20th, 21st, 22nd, 26th and 30th the sky was clear, but no aurora was observed; on all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,

*Director.*

METEOROLOGICAL OFFICE,  
Toronto, July 15th, 1895.



## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

APRIL, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SYNOPSIS OF THE WEATHER.

The chart of mean atmospheric pressure for April shows the pressure to have been .050 inches above average over the Lower Lakes, increasing to as much as +.140 inches over Cape Breton. Throughout the Pacific States it was also +.050 to +.100 inches, but in the Missouri and North Saskatchewan Valleys it was from .080 to .050 inches below average respectively, also in the Southern States it was from .050 to .080 inches below average.

Temperature all over the southern portion of the continent and in the Pacific States was below the average, northern Florida giving the largest deficit, namely 5°. North of the 40th parallel, it was on the other hand everywhere above the average, the excess being very marked in our North-west Territories and Manitoba, where it was from 5° to 12°.

April opened with fine cool weather in the North-west Territories, Manitoba, and over Eastern Canada and with snow and rain over Ontario, the latter caused by a depression situated in the Ohio Valley. The depression dispersed and the weather soon cleared in Ontario, but during the night of the 2nd another disturbance developed over the Southern States and passing quickly up the Atlantic coast, it gave on the 3rd a heavy rainfall over the Maritime Provinces, but apparently no very strong winds.

An area of low pressure which made its presence felt by some local showers in the North west Territories and Manitoba, more especially on the 4th, developed great energy as it passed south-eastward to the Lower Mississippi Valley. Early on the 6th, its rain area extended to the Lake Region, the winds at the same time increasing to strong breezes or moderate gales from the eastward. The low area moved slowly to the Lower Lakes with diminishing energy, giving a continuance of wet weather in Ontario, and also heavy rains in Quebec and the Maritime Provinces. When over Lake Ontario and New York State on the night of the 8th, it suddenly redeveloped much greater energy and strong winds and gales at once became general from the Lakes to the Atlantic, the storm apparently being more severely felt in the Lower St. Lawrence and the Gulf than elsewhere. The low area passed into the Gulf of St. Lawrence during the night of the 9th, and a period of fine, but for the most part cool, weather ensued.

During the passage of a little depression on the 12th, rain fell throughout the Lower Lake Region. On the 13th it gave rain, or in some places rain or snow, in Quebec, and also over the greater portion of the Maritime Provinces. This minor depression was joined early on the 14th by another depression from the Atlantic and for several days afterwards the combined system, at first of importance but gradually filling up, lay over the New England coast. At the same time the pressure kept persistently high over Cape Breton and the Gulf, consequently a steep gradient was

formed, and from the 14th until the 16th, inclusive, a heavy easterly gale prevailed throughout Quebec and the Maritime Provinces, when rain, or sleet and rain, fell almost continuously and in large quantities.

16th-30th.—The distribution of pressure from the Lakes to the Atlantic during this long interval was almost entirely anti-cyclonic. The weather was also on the whole unusually fine, and the temperature was generally much above the average. The only interruption to the fine weather worthy of notice happened during the passage of a slight depression when showers occurred in Ontario between the 21st and 22nd; in Quebec they were more widespread on the 22nd and 23rd, and on the 23rd they were general and fairly heavy in the Maritime Provinces. A few scattered showers only, were otherwise recorded, almost entirely confined to Quebec and the Maritime Provinces.

In the North west Territories and Manitoba the month was in many respects a phenomenal one, chiefly on account of its very high mean temperature; maxima of  $70^{\circ}$  in the shade were of very frequent occurrence. It was also for the greater part remarkably fine, and after the 4th there was little bad weather. Sleet or snow fell locally between the 9th and 10th in small quantities, and on a few other occasions, namely, the 15th, 20th, 21st, 27th and 28th, a few local rains or light showers were experienced.

#### TEMPERATURE.

The temperature for April was above the average throughout the Dominion: in British Columbia it ranged from about the average to  $3^{\circ}$  above; in the N. W. Territories and Manitoba it was from  $5^{\circ}$  to  $12^{\circ}$  above; in Ontario it was  $2^{\circ}$  to  $3^{\circ}$  above, and in some parts of north-western Ontario it was from  $6^{\circ}$  to  $8^{\circ}$  above; Quebec was from  $1^{\circ}$  to  $4^{\circ}$  above; New Brunswick  $1^{\circ}$  to  $4^{\circ}$  above; Nova Scotia  $1^{\circ}$  to  $2^{\circ}$  above, and in Prince Edward Island  $1^{\circ}$  above.

*The Highest and Lowest Temperatures in each Province during April were :*

British Columbia,  $79^{\circ}0$  on 22nd at Mission Valley and on 27th at Griffin Lake,  $9^{\circ}0$  on 6th at Barkerville.

North-west Territories,  $78^{\circ}7$  on 13th at Medicine Hat,  $12^{\circ}8$  on 9th at Prince Albert.

Manitoba,  $88^{\circ}4$  on 11th at Brandon,  $14^{\circ}0$  on 11th at Oakbank.

Ontario,  $84^{\circ}0$  on 29th at Trenton,  $0^{\circ}0$  on 1st at Savanne and on 5th at Sprucedale.

Quebec,  $72^{\circ}0$  on 29th at Richmond and St. Hyacinthe,  $6^{\circ}5$  on 12th at Chicoutimi.

New Brunswick,  $69^{\circ}0$  on 21st at Dalhousie,  $10^{\circ}0$  on 11th at Dalhousie.

Nova Scotia,  $68^{\circ}8$  on 22nd at New Glasgow,  $12^{\circ}2$  on 12th at Truro.

Prince Edward Island,  $63^{\circ}3$  on 22nd at Georgetown,  $11^{\circ}0$  on 1st at Georgetown.

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, APRIL, 1895.

u. Barometer not reduced to Sea Level.

\* Stations not furnished with Registering Thermometers.

[illegible]

PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT ALL STATIONS IN THE DOMINION OF CANADA, APRIL, 1895.

\* Stations not furnished with Registering Thermometers.

[illegible]





## PRECIPITATION.

The rainfall in Quebec, New Brunswick and Nova Scotia has been slightly above the average, in all the other Provinces it was below, the greatest deficiency occurring in part of British Columbia.

*The distribution is as follows :—*

In British Columbia the general rainfall was 2·90 in., but at some stations little or no rain fell.

In the North-west Territories rain has fallen generally to the amount of 0·21 in., or 1 in. below April, 1894.

In Manitoba the amount was 0·62 in., being 0·99 in. less than April, 1894, and 0·24 in. below the average.

In Ontario, West and South-west District, it was 1·63 in., or 0·33 in. below the average. In the North and North-west District it was 1·30 in., or 0·37 in. below the average. In the Central District it was 1·77 in., or 0·12 in. below the average; and in the East and North-east District it was 1·27 in., or 0·39 in. below the average.

In Quebec it was 1·85 in., or 0·54 in. above the average.

In New Brunswick it was 2·03 in., or 0·10 in. above the average.

In Nova Scotia it was 2·53 in., or 0·12 in. above the average.

In Prince Edward Island it was 1·17 in., or 0·61 in. below the average.

*Rainfall 5 inches and upwards during month :—*

BRITISH COLUMBIA.—Union, 6·89 in.; Beaver Creek, 9·27 in.; Sproat Lake, 10·41 in.; Rivers Inlet, 7·05 in.; Port Simpson, 8·48 in.

BERMUDA.—Prospect, 5·56 in.

*Rainfall 1 in. and upwards in 24 hours :—*

1. Union, 1·46 in.; Beaver Bank, 1·35 in.; Sproat Lake, 1·25 in.

2. Beaver Creek, 1·18 in.; Sproat Lake, 2·00 in.

3. Goldstream Lake, 1·40 in.; Langley, 1·41 in.; Loch Erroch, 1·50 in.; Hazlemere, 1·15 in.

6. Sproat Lake, 1·52 in.

8. Presqu'Isle, 1·00 in.

9. Quebec, 1·55 in.

10. Grand Manan, 1·00 in.; Truro, 1·06 in.

11. Sproat Lake, 1·00 in.

12. Rivers Inlet, 2·00 in.

13. Bermuda, 1·46 in.; Rivers Inlet, 1·23 in.

14. Bermuda, 1·82 in.; Union, 1·08 in.; Beaver Creek, 1·23 in.

15. Halifax, 1·15 in.; Sproat Lake, 1·50 in.

6. White Lake, B.C., 3·06 in.

21. Mellendean, 1·02 in.

28. Savanne, 1·10 in.

The snowfall throughout the Dominion has been below the average for April.

*The distribution is as follows :—*

In BRITISH COLUMBIA, over the whole province about 2 in. has fallen, about one-half of April, 1894.

In NORTH-WEST TERRITORIES, about 1 in. has fallen, about one-fourth of April, 1894.

In MANITOBA, about 1½ in. has fallen, or about 6 in. less than the average.

In the DISTRICTS OF ONTARIO the amount is 0·1 in., or 1·1 in. below the average; 1·9 in., 0·5 in. below the average; 0·3 in., or 1·4 in. below the average; 1·7 in., or 2·1 in. below the average.

In QUEBEC, 0·3 in., or 1·4 in. below the average.

In NEW BRUNSWICK, 5·7 in., or 0·9 below the average.

In NOVA SCOTIA, 2·9 in., or 4·7 below the average.

In PRINCE EDWARD ISLAND, 8·7 in., or 2·1 in. below the average.

*Snowfall 8 inches and upwards during the month :—*

BRITISH COLUMBIA. Glacier, 30 in.; Port Simpson, 12 in.

QUEBEC. Point des Monts, 9 in.; Cape Magdalen, 8 in.; Anticosti, W. P., 28 in.; Anticosti, S. W. P., 14 in.

NEW BRUNSWICK. Chatham, 17 in.; Grand Manan, 15 in.; Point Escuminac, 9 in.

NOVA SCOTIA. Pictou, 8 in.

PRINCE EDWARD ISLAND. Charlottetown, 11 in.

*Snowfall 3 in. and upwards in 24 hours :—*

1. Parry Sound, 4 in.; Coldwater, 4 in.; Ennismore, 4 in.; Sprucedale, 4 in.; Lindsay, 3 in.; Deseronto, 3 in.
2. Glacier, 4 in.
3. Chatham, 4 in.; St. Andrews, 5 in.; Anticosti, W. P., 3 in.; Bathurst, 3 in.
4. Grand Manan, 4 in.; Glacier, 6 in.; Cape Magdalen, 5 in.
7. Rivers Inlet, 3 in.
10. Hillview, 4 in.; Anticosti, W. P., 7 in.
11. Grand Manan, 4 in.; Glacier, 6 in.; Channell, 4 in.
13. Anticosti, W. P., 3 in.
14. Grand Manan, 3 in.; Anticosti, W. P., 6 in.
15. Chatham, 10 in.; Charlottetown, 5 in.; Georgetown, P.E.I., 5 in.; Bathurst, 3 in.
16. Sable Island, 3 in.; Glacier, 6 in.
17. Charlottetown, 3 in.; Pictou, 4 in.
18. Glacier, 5 in.
19. Glacier, 3 in.
23. Anticosti, W. P., 6 in.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (II'), the feeblest in brilliancy.*

1. Hillview, III; Brandon, Portage la Prairie, Treherne, III; Mellendean, Moose Jaw, IV; Henrietta, II; Savanne, Winnipeg, III.
2. Portage la Prairie, Moose Jaw, IV; Savanne, Chicoutimi, Winnipeg, III.
3. Hillview, IV; Channel Island, III; Savanne.
4. Channel Island, III.
5. Battleford, IV; Medicine Hat, III.
8. Mellendean.
9. Winnipeg, IV.
10. Grand Manan, IV; Quebec, IV; Moose Jaw, IV; Stuart's Lake, Denbigh, Georgetown, IV; Montreal, Peterborough, Stony Creek, IV; Galt, Elora, IV; Birnam, IV; Gravenhurst, IV; Richmond, I; Durham, IV; Ottawa, IV; Kingston, II.
11. Edmonton, III; Grand Manan, IV; Father Point, II; Battleford, IV; Medicine Hat, II; Minnedosa, I; Quebec, III; Hillview, I; Brandon, II; Portage la Prairie, Belmont, Treherne, II; Pembina Crossing, II; Moose Jaw, II; Kaslo, I; Montreal, Welland, I; Bancroft, IV; Dalhousie, N.B., Point Escuminac, IV; New Glasgow, Georgetown, Chicoutimi, Truro, III; Ottawa, II; Kingston, I; Winnipeg, II.
12. Sable Island, Charlottetown, IV; Father Point, III; Sydney, IV; Prince Albert, III; Minnedosa, III; Hillview, IV; Channel Island, II; Brandon, Portage la Prairie, Treherne, III; Pembina Crossing, III; Moose Jaw, III; Kaslo, II; Fort Steele, IV; Bancroft, IV; Savanne, Point Escuminac, III; New Glasgow, Georgetown, Truro, III.
13. Edmonton, III; Medicine Hat, IV; Prince Albert, II; Hillview, IV; Channel, Henrietta, II; Niagara, IV; Savanne, Winnipeg, IV.
14. Port Arthur, I; Mellendean, Birnam, III; Savanne.
15. Belmont, Treherne, IV; Moose Jaw, IV; Alameda, IV; Fort Steele, III; Savanne, Gravenhurst, III.
16. Charlottetown, IV; Yarmouth, IV; Grand Manan, IV; Father Point, III; Sydney, IV; Port Arthur, I; Hillview, III; Channel Island, II; Treherne, IV; Moose Jaw, IV; Sprucedale, Clontarf, IV; Bancroft, IV; Beatrice, IV; Gravenhurst, IV; Dalhousie, N.B.; Point Escuminac, III; New Glasgow, Georgetown, P.E.I.; Chicoutimi, Truro, III; Ottawa, II; Winnipeg, IV.
17. Father Point, IV; Medicine Hat, Qu'Appelle, III; Portage la Prairie, Moose Jaw, IV; Fort Steele, IV; Georgetown, IV; Bancroft, IV; Point Clark, IV; Savanne.
18. Father Point, IV; Port Arthur, III; Qu'Appelle, III; Hillview, IV; Pembina Crossing, IV; Point Escuminac, III.
19. Yarmouth, IV; Grand Manan, III; Father Point, III; Prince Albert, IV; Qu'Appelle, III; Sandy Point, II; Channel Island, III; Belmont, Treherne, III; Pembina Crossing, IV;

Fort Steele, IV ; Georgetown, IV ; Clontarf, IV ; Bognor, IV ; Bancroft, IV ; Elora, Gravenhurst, IV ; Point Escuminac, III ; Sable Island, Georgetown, P.E.I., Chicoutimi, Richmond, I ; Truro, III ; Durham, IV ; Winnipeg, IV.

20. Father Point, III ; Swift Current, II ; Medicine Hat, II ; Minnedosa, II ; Port Arthur, III ; Qu'Appelle, III ; Sandy Point, I ; Hillview, III ; Brandon, Cartwright, Treherne, I ; Pembina Crossing, III ; Moose Jaw, II ; Fort Steele, III ; Donald, Montreal, Elora, Gravenhurst, IV ; Point Escuminac, III ; Truro, IV ; Winnipeg, Barrie.

21. Grand Manan, III ; Portage la Prairie, Pembina Crossing, IV ; Fort Steele, IV ; Point Escuminac, IV ; Cape Chatte, Truro, IV.

22. Moose Jaw, IV ; Fort Steele, IV ; Savanac, Kingston, I.

23. Moose Jaw, IV ; Fort Steele, IV.

24. Father Point, III ; Minnedosa, IV ; Hillview, III ; Channel Island, IV ; Treherne, IV ; Moose Jaw, Henrietta, II ; Fort Steele, IV.

25. Minnedosa, III ; Hillview, IV ; Portage la Prairie, Moose Jaw, Fort Steele, IV ; Savanne, Winnipeg, IV.

26. Swift Current, III ; Minnedosa, I ; Port Arthur, II ; Quebec, IV ; Hillview, IV ; Treherne, III ; Channel Island, IV ; Pembina, III ; Fort Steele, IV, *arch 15° S. of Zenith* ; Hazlemere, Chilliwack, Agassiz, Montreal, Bognor, IV ; Gravenhurst, IV ; Savanne, Point Escuminac, Sable Island, Pictou, Cape Chatte, Truro, IV.

27. Quebec, IV ; Shoal, Lake, II ; Henrietta, III ; Alameda, II ; Sault Ste. Marie.

28. Shoal Lake, III.

29. Stratford, Winnipeg, IV.

*Thunder recorded on :—*

3. Bermuda.

4. Alameda.

5. Qu'Appelle, Cartwright, Rosebank, Pembina Crossing, Agassiz.

8. Langley (*quiet*), French Creek.

9. Abbotsford, Loch Erroch, Hazlemere (*heaviest since 1882*), Chilliwack, Agassiz, Kuper Island.

10. Oakbank, Mellendean, Fort Steele.

11. Selkirk, Mellendean, Kuper Island.

12. Port Arthur, Winnipeg, Kuper Island.

13. Bermuda, St. Thomas, Blenheim, Chatham, Cottam.

14. Bermuda.

15. Bermuda, Pembina Crossing.

16. Bermuda, Pilot Mound.

19. Rapid City, Treherne, Pembina Crossing, Winnipeg.

20. Savanne.

21. Port Arthur.

22. Bermuda.

24. Cottam.

25. Halifax.

26. Yarmouth.

30. Bermuda, Mellendean.

#### APPEARANCE OF SPRING BIRDS, &c.

ROBINS. Parker's Ridge, 20th; Banff, 14th; Kincardine, 1st; Lakefield, 8th; Alton, 1st; Stratford, 4th; Edmonton, 23rd; Halifax, 7th; Hillview, 25th; Channel Island, 20th; Portage la Prairie, Midland, 8th; Mount Forest, 4th; Oliver's Ferry, 13th; Ennismore, 8th; Dealtown, 2nd; Wiarton, 4th; Norquay, 12th; Treherne, 12th; Oonikup, 14th; Donald, 7th; Thorold, 4th; Pre-qu'Isle, 5th; Wilton Grove, 2nd; Aurora, 3rd; Sprucedale, 9th; Clontarf, 5th; Peterborough, 16th; Welland, 1st; Niagara, 2nd; Lucknow, 7th; St. Mary's, 3rd; Georgina, 5th; Port Rowan, Aurora, 3rd; DeCewsville, 4th; Galt, 3rd; Bancroft, 6th; Beatrice, 3rd; Savanne, 15th; Georgetown, 12th; Brome, 7th; Richmond, 12th; Lindsay, 4th; Deseronto, 3rd; Bathurst, 21st; Barrie, 8th.

CROWS. Minnedosa, 1st; Channel Island, 1st; Cartwright, 12th; Oliver's Ferry, 1st.

GREY BIRDS.—Presqu'Isle, 5th; Lucknow, 5th; Owen Sound, 6th; Georgetown, 12th; Stratford, 2nd.

BLACKBIRDS.—Minnedosa, 2nd; Qu'Appelle, 13th; Hillview, 15th; Cartwright, 12th; Aweme, 5th; Princeton, 3rd; Aurora, 3rd; Georgetown, 1st; Clontarf, 21st; Welland, 2nd; Lucknow, 3rd; Chatham, 22nd; Shoal Lake, 2nd; Norquay, 8th; Treherne, 5th; Mount Forest, 4th; Oliver's Ferry, 2nd; Wiarton, 8th; Bognor, 8th; Stony Creek, 3rd; Bancroft, 8th; Point Clark, 4th; Beatrice, 18th; Owen Sound, 5th; Brome, 7th; Thorold, 3rd; Stratford, 4th.

WRENS.—Minnedosa, 3rd; Thedford, 2nd; Lucknow, 10th.

KINGFISHER.—Kaslo, 22nd; Port Rowan, 19th.

MEADOW LARK.—Minnedosa, 4th; Hillview, 8th; Brandon, 4th; Cartwright, 8th; Aweme, 2nd; Stony Creek, 3rd; Point Clark, 5th; Shoal Lake, 1st; Morden, 1st; Mount Forest, 16th; Princeton, 5th.

SNIFE.—Minnedosa, 15th; Qu'Appelle, 8th; Moose Jaw, 7th; Presqu'Isle, 5th; Mount Forest, 28th; Wiarton, 6th.

SWALLOWS.—Pembina Crossing, 25th; Kaslo, 20th; Donald, 11th; Georgetown, 14th; Clontarf, 25th; Peterborough, 25th; Georgina, 19th; Port Rowan, 4th; Stony Creek, 17th; Galt, 30th; Stouffville, 29th; New Glasgow, 20th; Deseronto, 23rd; Spence's Bridge, 7th; Stratford, 21st.

GEENSE.—Channel Island, 4th; Presqu'Isle, 12th; Georgetown, 9th; Georgina, 6th; Stony Creek, 7th; Point Clark, 16th; Uplands, 16th; Parker's Ridge, 13th.

BLUE-BIRDS.—Thedford, 3rd; Princeton, 1st; Georgetown, 5th; Lucknow, 14th; DeCewsville, 1st; Banff, 21st; Lakefield, 7th.

WOODPECKERS.—Princeton, 8th; Georgetown, 9th; Galt, 13th; Owen Sound, 22nd.

HUMMING BIRDS.—Canobie, 19th; Quamichan, 19th; Hazlemere, 18th; French Creek, 5th.

DUCK.—Channel Island, 15th; Cartwright, 1st; Norquay, 6th; Morden, 2nd; Mellendean, 5th; Presqu'Isle, 13th; Stony Creek, 7th; Point Clark, 4th; Moose Jaw, 1st; Oonikup, 6th.

CRANES.—Pembina Crossing, 4th; Quamichan, 9th; French Creek, 5th; Lucknow, 5th.

FROGS.—Halifax, 28th; Minnedosa, 14th; Port Stanley, 8th; Qu'Appelle, 4th; Hillview, 1st; Portage la Prairie, 12th; Pembina Crossing, 3rd; Oonikup, 14th; Thorold, 4th; Presqu'Isle, 16th; Thedford, 22nd; Midland, 19th; Cartwright, 4th; Rathwell, 4th; Shoal Lake, 4th; Norquay, 1st; Rapid City, 2nd; Treherne, 6th; Wiarton, 7th; Lucknow, 8th; Georgina, 14th; Port Rowan, 4th; Spence, 18th; Bognor, 17th; Paris, 10th; Stony Creek, 4th; Galt, Bancroft, 17th; Princeton, 7th; Georgetown, 14th; Orillia, 17th; Clontarf, 20th; Welland, 6th; Niagara, 1st; St. Mary's, 20th; Brome, 15th; Truro, 24th; Durham, 18th; Fredericton, 22nd; Heron Bay, 20th; Stratford, 11th; Toronto, 22nd; Point Clark, 15th; Beatrice, 21st; Stouffville, 17th; Birnam, 4th; Owen Sound, 13th; Savanne, 17th; New Glasgow, 19th; Winnipeg, 5th.

**PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF APRIL, 1895.**

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON.	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....	0 03	0 15	0 34	0 39	0 49	0 55	0 50	0 49	0 49	0 51	0 51	0 38	0 22	8	..	..
KUPER ISLAND .....	..	..	03	27	39	41	46	50	46	45	59	52	45	15	8	..
AGASSIZ, B. C. ....	..	..	05	27	48	59	47	43	42	41	39	33	23	18	05	..
INDIAN HEAD.....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
BRANDON.....	..	..	13	52	67	67	61	71	69	67	69	69	60	36	04	..
WINNIPEG.....	..	05	31	47	55	64	72	79	69	70	63	57	59	35	04	..
WOODSTOCK.....	..	..	20	42	54	59	63	65	69	68	63	59	55	25	03	..
TORONTO.....	..	03	42	53	58	58	61	64	59	60	61	54	50	36	11	..
LINDSAY.....	..	02	34	40	51	58	61	59	62	58	60	50	44	38	06	8
BARRIE.....	..	15	42	49	52	56	58	58	55	54	54	55	48	40	09	..
KINGSTON.....	..	02	39	45	48	51	54	59	58	55	56	54	53	46	02	..
MONTREAL.....	..	02	37	41	44	46	45	48	45	52	51	53	43	27	..	..
FREDERICTON.....	..	01	37	55	68	66	66	65	64	42	65	63	63	49	13	..

	ESQUIMAULT.	KUPER ISLAND.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0 36	0 33	0 31	..	0 51	0 51	0 47	0 49	0 49	0 47	0 47	0 46	0 54
MAXIMUM DAILY AMOUNT.....	0 81	0 76	0 80	..	0 84	0 91	0 80	0 89	0 97	0 90	0 93	0 96	0 93
DATE .....	24	28	23	..	2	1	17	10	10	2	5	17	7
NO. OF DAYS COMPLETELY CLOUDED.....	6	5	6	..	3	2	5	7	6	6	7	8	7

**PROBABILITIES.**

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 584. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	84	66	12	6	85.7
LOWER LAKE REGION .....	97	77	14	6	86.6
UPPER ST. LAWRENCE .....	99	88	6	5	91.9
LOWER ST. LAWRENCE .....	98	78	15	5	87.2
GULF.....	96	86	9	1	94.3
MARITIME PROVINCES .....	110	94	11	5	90.5
TOTAL .....	584	489	67	28	89.5

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions, the reports from all observing stations in Canada are used.

The daily probabilities were issued by Probability Officer B. C. Webber.

## STORM WARNINGS.

During the month warnings on the approach of one storm was issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 15, of which 8 were verified. Two stations reported storms for which no warning was issued.

In conjunction with the warnings, predictions as to the probable directions of the wind were given, and of the 8 warnings verified as to force, 8, or 100 per cent, were fully verified.

No. 1. At 10.30 a.m. on the 3rd all Maritime stations and stations in the Gulf east of Pictou were warned for a strong E. to N. gale, owing to a depression then central off the New England coast. This passed quickly north-eastward during the day, and at some of the stations warned caused a strong gale.

### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR APRIL, 1895.

Mean westerly declination.....	4° 44'9
Mean horizontal force.....	0'16652
Mean vertical force.....	0'60332

The slight disturbance which prevailed on the ending of last month continued to noon of the 1st; from 6 a.m. to 9.10 a.m. a gradual decrease of the horizontal component was registered, but at 10 a.m. the magnet was steady and at its normal reading. Between the hours of 2 and 4 p.m. of the 1st, and also the early morning hours of the 2nd, the bifilar magnet was slightly disturbed. The changes of declination after 10 p.m. of the 1st were much more marked than the force changes, although there were no important departures from normal. About 7.45 p.m. of the 2nd another small disturbance set in and was visible up to the afternoon of the 3rd, the only remarkable feature recorded was a steady easterly march of the declination needle between noon and 2 p.m., with no appreciable changes of the force magnets. On the early morning hours of the 4th the magnets became slightly disturbed, and the changes assumed a more important character after 8.30 p.m., the declination needle then moving east, and at 9.29 p.m. the magnet was reading 24'3 east of the normal. The horizontal force decreased slightly between 6 and 8 a.m. of the 5th, the change being gradual. After 8 a.m. a recovery began, and at 10 a.m. the magnet was steady. A noticeable decrease of force was shown after 1 p.m. of the same date, but only lasted for a short time. During the night there were slight changes of both forces, but previous to 1 a.m. of the 6th the magnets became steady. On the evening of the 6th a slight disturbance was registered, but only lasted for a brief period. On the 8th curves were slightly abnormal, and small changes were also shown between 9 and 10 p.m. of the 9th, chiefly noticeable on the declination curve. At 6.30 p.m. of the 10th the magnets became slightly disturbed, and the disturbance was more marked at 1.30 a.m. of the 11th, the declination needle then moving east 17' in a short time; the next important swing occurred at 4 15 a.m., the change amounting to 30', the direction being east, and at 5.10 a.m. a westerly movement of 32' set in, after which the needle quieted down considerably. The horizontal force increased gradually from 8.10 p.m. of the 10th until 1 a.m. of the 11th, when a rapid decrease set in, but the departure from normal was slight. Throughout the 11th and 12th the horizontal force was changing, but not to any extent; the most conspicuous movement was a gradual decrease between 10 and 11 p.m. of the 11th, followed by a recovery, the magnet then vibrating sharply until it arrived at its normal reading, when it steadied down considerably, but still remained somewhat disturbed until midnight of the 12th, but nothing worthy of note was recorded. On the night of the 11th and early morning hours of the 12th the declination magnet was much disturbed; the most important swings were easterly at 8.10 p.m., amounting to 30', and then a return westerly of 40'. On the night of the 11th the needle was east of normal, and during the early morning hours of the next day it was generally west of normal.

From the 13th to the 19th slight changes were going on, chiefly noticeable on the declination curve, but nothing to speak of on the force curves. At 6.10 a.m. of the 23rd the declination needle was suddenly deflected east; this looked like the preliminary movement to a large disturbance, but nothing of consequence followed, the needle during the morning and afternoon hours showing slow waves of disturbance.

Between the hours of 8 and 10 a.m. of the 23rd the horizontal force fell gradually, the magnet then slowly moved to its normal position, but continued slightly disturbed until the afternoon of the 23rd. On the morning of the 26th slight changes were going on, the magnets during the after-

noon being steady : after 9 p.m. a slight disturbance sprung up and the movements became more important at 10.30 p.m., the declination magnet then moving west 28', when a return swing of 32' took place, after which the disturbance gradually passed off. The horizontal force between 10 and midnight fell gradually, after which a few sharp swings occurred, and at 0.25 a.m. the magnet slowly regained its normal reading. During the remainder of the month nothing of importance occurred. The only movement calling for any remark was a slight disturbance on the night of the 27th and 28th.

On the 2nd, 4th, 9th, 10th, 13th, 17th, 18th, 19th, 20th, 22nd, 23rd, 24th, 25th, 27th, 28th, 29th, 30th, the sky was clear and no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, August, 1895.





## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

MAY, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SUMMARY.

Atmospheric pressure was above the average throughout the United States east of the Mississippi, and also in Canada from Lake Superior east to the Atlantic; the greatest departure above mean pressure was at Sable Island,  $+1.00$  inches. It was also  $+1.050$  inches above average on the Californian coast, but elsewhere everywhere below average, and to the greatest extent in Alberta, where it was  $-1.10$  inches. Temperature was from  $1^{\circ}$  to  $4^{\circ}$  above average in all parts of Canada from Alberta to the Atlantic. In British Columbia, on the other hand, it was a little below average, and throughout the Pacific and North-west States and also south of the 40th parallel over the middle and eastern portion of the continent, it was likewise everywhere below average, generally from  $1^{\circ}$  to  $4^{\circ}$ .

The low areas were neither numerous nor important, and as a rule their tracks were so doubtful that no average rate of travel can be given.

1st—6th. During this period pressure was high over the eastern portion of the continent and low over the western portion, showers and thunderstorms were of daily occurrence from the Rockies to Manitoba, and in many places the rainfall was considerable; at the same time the weather from the Lakes to the Atlantic was on the whole fine, except in portions of the Lower St. Lawrence and Gulf, where there were frequent showers. Temperature, as a rule, was much above the average, and maxima of over  $80^{\circ}$  in the shade were recorded in many places. On the 4th a north-easterly gale prevailed in the Lower St. Lawrence Valley, and on one or two occasions strong winds were experienced in the North-west Territories and Manitoba.

The 7th was a very warm day over nearly all portions of Canada, but exceptionally so in many parts of the Maritime Provinces, more especially perhaps in the Annapolis Valley, where the temperature rose to over  $90^{\circ}$  in the shade. Local thunderstorms occurred in Ontario and Quebec.

On the 8th, there were showers in the Lower St. Lawrence and the Maritime Provinces, but as a rule they were light. The 9th and 10th were fine and very warm from the Lakes to the Atlantic.

In the North-west Territories and Manitoba, during the passage of a minor depression between the 7th and 8th, some local showers were experienced. The depression was immediately followed by an important anticyclone and a decidedly cold wave which brought heavy frosts on the 9th and 10th, from the Rockies to Manitoba.

On the 11th, pressure gave way quickly over the Lower Lake Region, a well marked depression was formed and rain fell generally and in many places was fairly heavy, extending by evening to the St. Lawrence Valley and later on to the Maritime Provinces, accompanying the eastward advance of the depression. Meanwhile the North-west cold wave had been approaching, and in the Lake Regions, when the winds shifted to the west and north-west, the weather turned very much colder during the evening and night of the 14th, and in many places there were destructive frosts which did all the greater damage, especially to the fruit crop and early vegetables, following as they did, the phenomenally fine warm weather which had previously prevailed and which had caused such an early and rapid development of vegetation. Frosts to a lesser extent were experienced in Quebec, but the Maritime Provinces fortunately escaped.

Between the evening of the 13th, and on the 14th, a slight depression which had travelled from the North-west, passed over the southern portion of the Lower Lakes, and owing to the prevailing low temperature the precipitation which accompanied it in Ontario was in many places in the form of snow, several inches falling in some localities, an unusual occurrence so late in the season. The depression, after reaching the New England Coast, moved north-eastward over the Maritime Provinces and caused between the 15th and 16th, a general, and as a rule, a moderate fall of rain, which extended westward locally as far as Montreal. In some portions of the Gulf there was snow as well as rain.

In Ontario, on the early mornings of the 15th and 16th, sharp frosts again occurred over the greater portion of the province.

On the 18th, the weather became showery over the Lakes, the Upper St. Lawrence and the Maritime Provinces, as a depression approached from the north-westward, and another one of smaller dimensions moved up the Atlantic Coast; along the Nova Scotian Coast the rainfall was very heavy, especially in Cape Breton, where it amounted to almost two inches; a gale of short duration is also reported to have occurred at Louisbourg. In the Lower St. Lawrence and the Gulf little or no rain fell, but in the Lake Region in most places, there was a good rain.

These depressions were succeeded by another important anticyclone and pronounced cold wave from the North-west. The cold wave maintained its energy until reaching the Lakes, and during the nights of the 20th and 21st heavy frosts were again generally recorded throughout Ontario. Fortunately the cold wave became less pronounced after reaching the Lakes, and the frosts did not extend either to Quebec or the Maritime Provinces.

The weather conditions during the last ten days of the month, from the Lower Lake Region to our Atlantic coast may be characterized on the whole as generally fine, more especially in the Lake Region, where rain only fell at all generally on the 26th, and in small quantities, except during local thunderstorms. In the Upper St. Lawrence rain was general and fairly heavy on the 26th and 27th and the Maritime Provinces between the 26th and 28th. On the 21st and 22nd there were some local showers in the Lower St. Lawrence and the Maritime Provinces, and on the 24th there were a few local showers almost entirely confined to Eastern Cape Breton. Winds were at no time very high, and temperature on the whole was much above the average. This was especially the case in Ontario, the 29th, 30th and 31st, when the daily maxima ranged between 80° and 94° in the shade, high temperatures even for mid-summer.

In the North-west Territories and Manitoba after the 10th, and until the end of the month, perhaps the most remarkable weather feature was the frequency of the frosts, they occurred with severity on the nights or early mornings of the 11th, 12th, 17th, 18th, 20th, 21st, 29th and 30th. There were also some heavy rains, noticeably between the 13th and 14th, the 23rd and 24th, the 26th and 29th, and also in the 31st. Pressure was often low and some very high winds were experienced. Notwithstanding the fact that the nights were so often very cold, the day temperatures on the whole were high, so much so that the mean temperature in Manitoba was actually above the average as already stated. The frosts had the effect of entirely killing the wild fruit crop in most localities, likewise all garden stuff above ground; trees and shrubs were also stripped of their foliage.

In British Columbia the rainfall exceeded the average in nearly all localities, and the weather was on the whole cool with some light frosts in the low districts. However, at Quamichan the elder trees were in full leaf on the 10th, and the oak on the 22nd, whilst at Loch Erroch wild strawberries were ripe on the 30th.

#### TEMPERATURE.

The temperature for May was slightly below the normal in British Columbia and the North-west Territories; in Manitoba in general it was about 3° above; in Ontario it was from 2° to 5° above; in Quebec it was from 2° to 3° above, and in the Maritime Provinces it was from 1° to 4° above.

*The Highest and Lowest Temperatures in each Province during May were :*

British Columbia, 92°·0 on 18th at Griffin Lake, 20°·0 on 14th at Donald.

North-west Territories, 85°·7 on 13th at Medicine Hat, 12°·3 on 10th at Alameda.

Manitoba, 81°·0 on 6th at Emerson, 18°·5 on 20th at Elkhorn.

Ontario, 100°·5 on 30th at Renfrew, 10°·0 on 12th at Nipigon.

Quebec, 91°·0 on 11th at St. Hyacinthe, 22°·0 on 1st at Anticosti, W.P.

New Brunswick, 91°·7 on 7th at Fredericton, 20°·0 on 15th at Bathurst.

Nova Scotia, 90°·4 on 7th at Halifax, 22°·4 on 5th at Sydney.

Prince Edward Island, 83°·0 on 7th at Georgetown, 28°·2 on 1st at Charlottetown.





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## PRECIPITATION.

*The General Distribution of rain is as follows :—*

In British Columbia the rainfall was in general 3'56 in., or about 1'81 above the average.

In the North-west Territories, 1'43 in., or about 0'80 in. below the average.

In Manitoba the rainfall was 3'47 in., 1'02 in. above the average.

In Ontario, West and South-west District, it was 2'35 in., or 0'13 in. above the average. In the North and North-west District it was 2.24 in., or 0'31 in. below the average. In the Central District it was 2'18 in., or 0'30 in. above the average; and in the East and North-east District it was 2'66 in., or 0'35 in. above the average.

In Quebec it was 3'02 in., or 0'22 in. above the average.

In New Brunswick it was 2'74 in., or 0'51 in. below the average.

In Nova Scotia it was 3'34 in., or 0'04 above the average.

In Prince Edward Island it was 3'06 in., or 0'06 in. above the average.

*Rain, all 5 inches and upwards during the month :—*

BRITISH COLUMBIA—Rivers Inlet, 5'78 in.; Alberni, 5'97 in.; Pilot Bay, 8'49 in.; Abbotsford, 6'39 in.; Chilliwack, 6'75 in.; Agassiz, 6'44 in.; Beaver Creek, 6'90 in.; Loch Erroch, 9'96 in.

MANITOBA—Stony Mountain, 5'61 in.

NOVA SCOTIA—Yarmouth, 5'28 in.

*Rain 1 inch and upwards in 24 hours :—*

4. Henrietta, 1'00 in.; Hillview, 2'48 in. (2 to 8 p.m. 1.95).

6. Bathurst, 1'00 in.

7. Wilton Grove, 1'20 in.

8. Clontarf, 1'25 in.

10. Thompson, 1'41 in.

11. Rockcliffe, 1'05 in.; Beatrice, 1'02 in.; Gravenhurst, 1'97 in.

12. St. Hyacinthe, 1'19 in.; Thedford, 1'24 in.

13. Father Point, 1'08 in.; Yarmouth, 1'26 in.; Point des Mouts, 1'50 in.

14. Stony Creek, 1'12 in.; Huntsville, 1'04 in.; Dealtown, 1'06 in.; Blenheim, 1'48 in.; Battleford, 1'14 in.

18. Orillia, 1'09 in.; Wanstead, 1'53 in.; Sunshine, 1'46 in.; Coldstream, 1'49 in.; Mount Forest, 1'43 in.; Georgetown, 1'07 in.; Watford, 1'30 in.; Aurora, 1'25 in.; Thedford, 1'58 in.

19. Sydney, 1'84 in.; Channell, 1'02 in.; Birnam, 1'58 in.; Georgina, 1'49 in.; St. Mary's, 1'65 in.; Bancroft, 1'87 in.; Alton, 2'03 in.; Stouffville, 1'19 in.; Sarnia, 1'45 in.; Wyoming, 1'45 in.; Ennismore, 1'09 in.; Haliburton, 1'35 in.; Stratford, 1'08 in.

20. Yarmouth, 1'26 in.

22. Chilliwack, 1'44 in.; Spence's Bridge, 1'10 in.; Loch Erroch, 3'46 in.

25. Abbotsford, 1'12 in.; Savanne, 1'70 in.; Port Arthur, 1'38 in.

26. Beatrice, 1'30 in.; Loch Erroch, 1'40 in.

27. Point le Preaux, 1'15 in.

28. Prince Albert, 1'25 in.

30. Richmond, 1'04 in.; Renfrew, 1'02 in.

31. Indian Head, 1'70 in.

*Snowfall—snow has fallen generally throughout the Dominion except in the extreme eastern provinces.*

5. Baukerville, 2 in.

9. Oonikup, 2 in.

10. Rathwell; Emerson.

11. Orillia; White River, 3 in.; Emerson; Haileybury.

12. Port Stanley; St. Mary's; Welland, 5 in.; London; Stratford; White River, 0'6 in.; Emerson; Haileybury.

13. Chicoutimi, 4 in.; Whiteside; Durham, 2 in.

14. Parry Sound, 2 in.; Saugeen; Richmond; Port Dover, 1'4 in.; Georgina, Whiteside, Waterford, 0'7 in.; Orillia, Virgil, 2 in.; Nottawasaga, 4 in.; London; Stratford; Sprucedale, 0 in.; Lindsay.

15. Whiteside.
  16. Chicoutimi, 1 in. ; White River, 1 in. ; Point des Monts, 4 in.
  17. Dalhousie, N. B. ; Hillview, 0·3 in. ; Rathwell ; Norquay ; Turtle Mountain.
  18. Brandon ; Greta ; Rosebank ; Belmont ; Morden ; Rathwell ; Norquay ; Emerson ; Cartwright, 4 in. ; Hartney, 2 in. ; Treherne ; Winnipeg, 0·6 in.
  19. Saugeen ; Roseberry, 4 in. ; Pembina Crossing, 4 in. ; Rathwell ; Pilot Mound, 4 in. ; Cartwright, 6 in. ; Orillia ; Haileybury.
  20. Parry Sound ; Saugeen ; Chicoutimi, 1·6 in. ; Greenwood ; Norquay, 2 in. ; Whiteside, Lakefield ; Nottawasaga, 1 in. ; Haileybury.
  21. Whiteside.
  22. Princeton, 2 in.
  23. Oonikup, 1 in.
  24. Chaplin, 2 in.
  28. Pincher Creek, 4 in. ; Calgary, 0·4 in. ; Medicine Hat, 0·5 in.
  31. Winnipeg, 0·4 in.
- Frosts recorded on ; (where frost is not noted by observer the actual temperature is given):—*
1. Clontarf 23°.
  2. Fredericton 26°.
  4. Esquimalt.
  5. Esquimalt.
  9. Selkirk, Shoal Lake 23°, Edmonton 24°.
  10. Hillview, ice  $\frac{1}{4}$  in., Pilot Mound, Rathwell, Rapid City, *ice*, Belmont, *severe*, Brandon, Rosebank, Shoal Lake 17°, Edmonton 25°, Elkhorn 22°.
  11. Hillview, ice  $\frac{1}{2}$  in., Pilot Mound, *severe*, Cartwright 26°, Turtle Mountain, ice  $\frac{3}{8}$  in., Rapid City, ice  $\frac{1}{2}$  in., Belmont, Brandon, Rosebank, Roseberry, Mattawa, Biscotasing 29°, Channel Island 25°, Lucknow, ice  $\frac{1}{4}$  in., White River 24°, QuAppelle 21°, Elkhorn 21°.
  12. Rosebank, Nepigon 10°, Schreiber 29°, Princeton, *heavy*, Presqu'Isle, Wiarton, Aurora, Wilton Grove, Georgetown, Ont., *ice*, Midland, Wyoming, Goldstream, Sutton, Sault Ste. Marie 27°, Alton, ice  $\frac{1}{4}$  in., Beatrice, Orillia 26°, Brantford, Port Dover, White River 19°, Barrie, ice  $\frac{1}{10}$  in.
  13. Pilot Mound, *severe*, Cartwright 24°, Norquay, *oats frozen*, Rathwell 13°, Morden, *severe*, Peterborough, Clontarf, ice  $\frac{1}{2}$  in., Princeton, Thedford, *severe*, Presqu'Isle, ice  $\frac{1}{2}$  in., Waterford 25°, Whiteside, St. Marys, Georgina, Birnam, Port Dover, Durham, *severe*, London, Stratford 22°, Woodstock 24°, White River 19°, Scarborough 26°, Watford, Midland, *heavy*, Ennismore, Mount Forest 23°, St. George, *heavy*, Chatham, Stony Creek, ice  $\frac{1}{4}$  in., St. Anns 26°, Thorold 26°, Huntsville, ice  $\frac{1}{16}$  in., Sunshine, ice  $\frac{1}{4}$  in., Bognor, ice  $\frac{1}{2}$  in., Gravenhurst, ice  $\frac{1}{4}$  in., Lucknow, Owen Sound 24°, Conestogo 24°, DeCewsville 24°, Barclay 27°, Alton, ice  $\frac{3}{4}$  in., Beatrice, *ice*, Virgil 27°, Welland, ice  $\frac{1}{2}$  in., Orillia, Collingwood 28°, Barrie, ice  $\frac{3}{10}$  in.
  14. Peterborough, Clontarf, ice  $\frac{1}{2}$  in., Nepigon 16°, Heron Bay 28°, Watford, Orillia, Ennismore, Wyoming, Paris, ice  $\frac{3}{8}$  in., DeCewsville, Burk's Falls 28°, Savanne 17°, Birnam, ice  $\frac{1}{16}$  in., White River 14°.
  15. Spence, Peterborough, Clontarf, *ice*, Cottam, *heavy*, Thedford, *severe*, Dealtown, ice  $\frac{1}{8}$  in., Presqu'Isle, ice  $\frac{1}{4}$  in., Oliver's Ferry, Watford, Georgetown, Ont., *ice*, Ennismore, Wyoming, Mount Forest, Huntsville, Coldstream 24°, Bognor, *ice*, Chatham, Lucknow, Sarnia 24°, Birnam, Barrie, ice  $\frac{1}{10}$  in.
  16. Pilot Mound, Roseberry, Peterborough, Clontarf, *ice*, Cottam, Thedford, *severe*, Dealtown, ice  $\frac{1}{16}$  in., Presqu'Isle, frost  $\frac{1}{2}$  in., Wiarton, Aurora, Oliver's Ferry, Georgetown, Ont., *ice*, Ennismore, Coldstream 24°, Chatham, St. Anns, Lucknow, Wanstead, DeCewsville, Orillia, Waterford, Georgina, Birnam, ice  $\frac{3}{16}$  in. ; Barrie, ice  $\frac{2}{10}$  in.
  17. Pilot Mound, Cartwright 24°, Rapid City, *ice*, Belmont, *ice*, Clontarf, Cottam, Dealtown, *ice*, Presqu'Isle, ice  $\frac{1}{8}$  in., Aurora, Ennismore, Mount Forest, St. George, Chatham, St. Anns, Lucknow, Sarnia 27°, DeCewsville, Birnam, ice  $\frac{1}{4}$  in., Port Dover.
  18. Hillview, ice  $\frac{1}{2}$  in., Rapid City, *ice*, Belmont, *ice*, Watford, Prince Albert, 18°.
  19. Hillview, ice  $\frac{1}{2}$  in., Rapid City, *ice*, Belmont, *ice*, Brandon, North Bay 27°, Nepigon 25°, Princeton, Blenheim, Aurora, Bognor, *ice*, Prince Albert 17°.
  20. Hillview, ice  $\frac{3}{4}$  in., Belmont, *ice*, Shoal Lake 19°, Clontarf, *ice*, North Bruce 29°, Blenheim, ice  $\frac{1}{4}$  in., Thedford, *severe*, Presqu'Isle, ice  $\frac{1}{4}$  in., Aurora, Wilton Grove, Georgetown, Ont., *ice*,

Wyoming, Coldstream 27°, Sutton, Bognor, *icc*, St. George, Birnam, ice  $\frac{1}{8}$  in., Port Dover, Qu'Appelle 24°, Toronto, ice  $\frac{1}{8}$  in., Elkhorn 18°, Chatham, St. Anns, DeCewsville, Alton, ice  $\frac{1}{8}$  in., Savanne 19°, Waterford, Barrie, ice  $\frac{1}{10}$  in.

21. Hillview, ice  $\frac{1}{4}$  in., Cartwright 24°, Belmont, *icc*, Rosebank, Port Rowan, Cottam, Dealtown, ice  $\frac{1}{10}$  in., Aurora, Georgetown, Ont., *icc*, Mount Forest 23°, Coldstream, Sutton, St. George, Chatham, Lucknow, Wanstead 24°, Conestogo 25°, Sarnia 23°, Stouffville, ice  $\frac{3}{16}$  in., DeCewsville 25°, Savanne 19°, Welland,  $\frac{3}{4}$  in., Waterford, Birnam,  $\frac{3}{4}$  in., Port Dover, London, Stratford 22°, Toronto, ice  $\frac{1}{10}$  in., Barrie, ice  $\frac{1}{10}$  in.

22. Haliburton 24°, Peterborough, Cottam, Oliver's Ferry, Ennismore, Waterford, Mount Forest, Coldstream, St. George, Lucknow, Alton, Lakefield 27°, Whiteside 26°, Ottawa 27°, Coldwater, ice  $\frac{1}{2}$  in., Barrie, ice  $\frac{1}{10}$  in.

25. Cartier 24°, Truro, *icc*, Esquimalt.

26. Pilot Mound, Cartwright 24°.

27. Georgetown, Ont., White River 24°.

28. North Bruce, Blenheim, Presqu'Isle, Lucknow, Alton, Birnam.

30. Hillview, ice  $\frac{1}{4}$  in., Cartwright 25°, Belmont, *icc*, Greenwood, Rivers Inlet, Elkhorn 25°.

*Aurora recorded—*

Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV'), the feeblest in brilliancy.

1. Quebec, IV ; Cape Norman, II ; Beatrice, III.

2. Savanne, Haileybury, III.

3. Port Arthur, II.

5. Cape Norman, III ; Savanne.

6. Henrietta, III ; Pembina Crossing, II ; Savanne, Medicine Hat, IV.

7. Hillview, III ; Belmont, Pembina Crossing, IV ; Channel Island, IV ; Savanne.

8. Moose Jaw, Hillview, III ; Emerson, IV.

9. Hillview, III ; Pembina Crossing, IV ; Port Rowan.

10. Fort Steele, III ; Hillview, III, P.

11. Savanne, Haliburton.

12. Hillview, III ; Pembina Crossing, IV.

13. Shoal Lake, IV ; Savanne.

14. Fort Steele, IV ; Point Escuminac, III ; Cape Magdalen, Pembina Crossing, IV ; Channel Island, III ; Gravenhurst, IV ; Sault St. Marie ; Truro, III ; Haileybury.

15. Sable Island, Hillview, IV ; Pembina Crossing, III ; Savanne, Haileybury, IV.

16. Hillview, III ; Pembina Crossing, IV.

17. Charlottetown, IV ; Cape Magdalen, Cape Norman, II ; Truro, IV ; Haileybury.

18. Savanne.

19. Alameda, IV ; Moose Jaw, Hillview, III ; Savanne, Truro, IV ; Haileybury.

20. Point Escuminac, III ; Hillview, IV ; St. Albans, III ; Shoal Lake, II ; Pembina Crossing, IV ; Savanne, Georgetown, Ont., IV ; Minnedosa, III.

21. Quebec, IV ; Alameda, IV ; Hillview, III ; Savanne, Clontarf, IV ; Port Arthur, II.

22. Haileybury.

25. Hillview, IV ; Haileybury.

26. Hillview, IV ; Savanne.

27. Savanne, Haileybury.

28. Georgina, Virgil, III ; Toronto, IV ; Haileybury.

29. Port Arthur, II ; Haileybury.

30. Charlottetown, IV ; Fort Steele, III ; Hillview, III ; Savanne, Truro, IV ; Prince Albert, I ; Medicine Hat, III.

*Thunder recorded on :*

1. Hillview, Portage la Prairie, Oakbank, Roseberry, Treherne, Turtle Mountain, Rathwell, Pembina Crossing, Shoal Lake, Prince Albert, Medicine Hat, Emerson.

2. St. Albans, Oakbank, Brandon, Roseberry, Treherne, Carman, Norquay, Turtle Mountain, Pembina Crossing, Belmont, Rosebank, Shoal Lake, Cowal, Minnedosa.

3. Charlottetown, Port Stanley, Alameda, Cannington, Point Escuminac, St. Alban's, Chicoutimi, Oakbank, Brandon, Roseberry, Pilot Mound, Winnipeg, Norquay, Rathwell, Pembina Cross-



ing, Belmont, Rosebank, Stouffville, Port Rowan, Lucknow, Conestogo, Alton, Point Clark, Savanne, Welland, Birnam, Mattawa, Thedford, Lion's Head, Wilton Grove, Coldstream, Stony Creek, Port Dover, Minnedosa, Medicine Hat, Emerson, Haileybury.

4. Saugeen, Kaslo, Cannington, Henrietta, Moose Jaw, St. Alban's, Belmont, Portage la Prairie, Oakbank, Treherne, Norquay, Pembina Crossing, Rosebank, Haliburton, Sprucedale, Peterborough, Clontarf, Uplands, Midland, Huntsville, Sunshine, Gravenhurst, Bancroft, Beatrice, Burk's Falls, Lakefield, Whiteside, Coldwater, Winnipeg, Qu'Appelle, Port Arthur, Elkhorn, Lindsay.

5. Father Point, Peterborough, Cowal, Thompson, Gravenhurst, Owen Sound, Durham, Barrie.

6. Port Stanley, Chicoutimi, Rathwell, Sarnia, Cottam, Pelee Island, Blenheim, Dealtown, Wilton Grove, Cowal, Midland, Wyoming, Huntsville, Coldstream, Sunshine, Point Clark, Beatrice, Whiteside, St. Mary's, London, Fredericton, Edmonton, White River, Barrie.

7. Montreal, Father Point, Rockliffe, Port Stanley, Point Escuminac, Chicoutimi, Stouffville, Port Rowan, Peterborough, Clontarf, Cottam, Pelee Island, Thedford, Scarborough, Wilton Grove, Georgetown, Ont., Wyoming, Huntsville, Coldstream, Deer Park, Stony Creek, St. Anns, Owen Sound, Conestogo, Alton, Point Clark, Bancroft, Renfrew, Welland, Lakefield, Georgina, Birnam, Brantford, Port Dover, Durham, London, Stratford, Anticosti, S.W.P., Toronto, Lindsay, Haileybury, Barrie.

8. Montreal, Quebec, Alameda, Point Escuminac, Dalhousie, Chicoutimi, Clontarf, Cottam, Pelee Island, Thedford, Denbigh, Wyoming, St. George, Stony Creek, St. Anns, Point Clark, Bancroft, St. Mary's, London, Fredericton.

9. Calgary, Roseberry, Cowal, Savanne, Port Arthur, St. Andrews.

10. Saugeen, Georgetown, P.E.I., Port Rowan, Uplands, Wiarton, Midland, Coldstream, Thompson, Point Clark, Bancroft, Georgina, Birnam, Swift Current, White River.

11. Montreal, Quebec, Father Point, Rockliffe, Parry Sound, Saugeen, St. Hyacinthe, Richmond, Chicoutimi, Port Rowan, Peterborough, Clontarf, Mattawa, Wiarton, Toronto, Lindsay, Uplands, Lion's Head, Presqu'Isle, Scarborough, Georgetown, Ont., Cowal, Wyoming, Mount Forest, Huntsville, Sutton, Bognor, Gravenhurst, St. George, Stony Creek, Paris, St. Anns, Lucknow, Owen Sound, Conestogo, Alton, Point Clark, Bancroft, Beatrice, Burk's Falls, Virgil, Welland, Whiteside, Georgina, Birnam, Brantford, Port Dover, Durham, Coldwater, *severe*, London.

12. Thedford.

14. Pilot Mound, Rathwell, Pembina Crossing.

15. Sable Island, Norquay.

16. Emerson.

19. Sydney, Sable Island.

20. Donald, Pelee Island.

23. Rathwell, Pembina Crossing, Belmont, Savanne, Minnedosa.

25. Agassiz.

26. Rockliffe, Parry Sound, Oakbank, Port Rowan, Haliburton, Sprucedale, Uplands, Presqu'Isle, Midland, Mount Forest, Coldstream, Bognor, Owen Sound, Bancroft, St. Mary's, Georgina, Durham, Coldwater, Stratford, Medicine Hat, Barrie.

27. Oakbank, Rathwell, Belmont, Brandon, Thompson, Beatrice, Minnedosa.

28. Carman, Wiarton, Savanne.

29. White River.

30. Montreal, Father Point, St. Hyacinthe, Richmond, Clontarf, Stony Creek, Paris, Bancroft, St. Mary's, Edmonton, Haileybury.

31. Point Lepreaux, Dalhousie, Portage la Prairie, Roseberry, Pembina Crossing, St. John, Yarmouth, St. Andrews.

#### MIGRATION OF SPRING BIRDS, &c.

GEESE.—Savanne, 1st.

SWALLOWS.—Hazlemere, 3rd; Georgetown, P. E. I., 9th; Treherne, 6th; Shoal Lake, 21st; Norquay, 5th; Bognor, 23rd; Gravenhurst, 1st; Lucknow, 1st; Owen Sound, 20th; Point Clark, 4th; Bancroft, 1st; Orillia, 2nd; Port Arthur, 2nd; Barrie, 5th.

BLUEBIRDS.—Fort Steele, 8th.

BLACKBIRDS.—Haileybury, 3rd.

YELLOWBIRDS.—Moose Jaw, 26th; Pembina Crossing, 15th; Port Rowan, 4th; Thedford, 4th; Bognor, 9th; Owen Sound, 18th; DeCewsville, 2nd; St. Mary's, 4th; Barrie, 27th.

WHIP-POOR-WILL.—St. Alban's, 8th; Pembina Crossing, 7th; Norquay, 2nd; Cartwright, 7th; Clontarf, 3rd; Mount Forest, 29th; Gravenhurst, 4th; DeCewsville, 4th; Alton, 2nd; Georgina, 4th.

CATBIRD.—Pembina Crossing, 11th; Mount Forest, 5th; St. Mary's, 4th.

ORIOLE.—Pembina Crossing, 27th; Port Rowan, 3rd; Owen Sound, 4th; DeCewsville, 1st; St. Mary's, 3rd.

FIRE-FLIES.—Pembina Crossing, 29th; Bognor, 28th; Gravenhurst, 9th; Lucknow, 28th.

WRENS.—Pembina Crossing, 18th; Owen Sound, 11th.

KINGFISHER.—Cartwright, 3rd; Mount Forest, 9th; Owen Sound, 16th; Stouffville, 8th.

HUMMINGBIRD.—Clontarf, 24th; Georgetown, 8th; Owen Sound, 19th; Orillia, 28th; Kuper Island, 12th, Barrie, 21st.

FROGS.—Haileybury, 2nd.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF MAY, 1885.

	HOURS ENDING															
	5	6	7	8	9	10	11	NOON.	1	2	3	4	5	6	7	8
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.		P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
ESQUIMAULT .....	..	0.02	0.28	0.26	0.45	0.62	0.62	0.65	0.67	0.64	0.66	0.63	0.56	0.53	0.12	..
KUPER ISLAND .....	..	.03	.29	.41	.47	.56	.65	.56	.57	.60	.64	.64	.61	.55	.34	..
AGASSIZ, D. C. ....	..	.62	.14	.28	.37	.39	.39	.34	.39	.42	.40	.44	.40	.27	.06	..
INDIAN HEAD .....	..	.00	.41	.56	.73	.76	.75	.71	.68	.71	.76	.75	.63	.46	.24	..
BRANDON .....	..	.04	.27	.39	.54	.61	.60	.63	.63	.64	.62	.57	.53	.41	.24	..
WINNIPEG .....	..	.29	.32	.37	.50	.62	.66	.72	.78	.72	.72	.68	.66	.64	.40	..
WOODSTOCK .....	..	.11	.47	.60	.65	.72	.73	.72	.82	.89	.75	.70	.63	.61	.34	..
TORONTO .....	..	.24	.63	.65	.69	.67	.68	.65	.61	.64	.75	.72	.69	.62	.20	..
LINCOLN .....	..	.21	.38	.58	.64	.57	.61	.56	.57	.61	.59	.69	.62	.58	.56	.16
BARRIE .....	..	.25	.49	.62	.68	.66	.62	.59	.59	.72	.69	.63	.66	.63	.25	..
KINGSTON .....	..	.19	.43	.54	.62	.63	.65	.72	.71	.67	.60	.51	.53	.49	.29	..
MONTREAL .....	..	.12	.41	.61	.64	.59	.63	.65	.60	.64	.66	.57	.39	.32	.05	..
FREDERICTON .....	..	.12	.30	.39	.39	.45	.50	.65	.72	.69	.64	.64	.59	.56	.44	.8

	ESQUIMAULT.	KUPER ISLAND.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINCOLN.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.44	0.45	0.28	0.54	0.43	0.62	0.58	0.57	0.53	0.54	0.51	0.53	0.48
MAXIMUM DAILY AMOUNT .....	0.78	0.85	0.87	0.86	0.85	0.90	0.90	0.88	0.97	0.92	0.90	0.96	0.93
DATE .....	11-13	14	10	12	21	20	17	16	16	28	17	1	1-14
NO. OF DAYS COMPLETELY CLOUDED.....	1	1	8	2	1	1	1	2	4	1	2	5	5

## PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 567. These were divided as follows :—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	84	65	13	6	85.1
LOWER LAKE REGION.....	113	97	7	9	85.9
UPPER ST. LAWRENCE.....	93	75	10	8	80.6
LOWER ST. LAWRENCE.....	92	64	15	13	77.7
GULF.....	87	70	7	10	84.4
MARITIME PROVINCES .....	98	73	17	8	83.2
TOTAL.....	567	414	69	54	84.4

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from all observing stations are used.

## STORM WARNINGS.

During the month warnings on the approach of four storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 94, of which 83 were verified. At 10 stations however the force exceeded that indicated by the signals displayed and 4 stations reported warnings received late, owing to delay in transmission.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 80 warnings verified as to force 70, or 87.5 per cent were fully verified, and 80, or 100 per cent were fully and partially verified.

1. In advance of a long trough of depression, which stretched from Lake Superior to Texas, and was backed up by an important anticyclone during the 9th to the west, cautionary signals for a westerly gale were ordered for Lake Superior ports at 10 p.m. on the 9th. At 11 p.m. next day all Georgian Bay and Lake Huron stations were similarly warned, and on the morning of the 11th, at 10 a.m., all Lakes Erie and Ontario stations were warned. The depression passed over the Lakes on the 11th, when steep gradients were formed on its western side, and a moderate to fresh north-west gale set in throughout the Lake district. At 11 a.m. on the 11th, stations on the St. Lawrence River and in the Gulf of St. Lawrence as far south as Chatham, were warned for a moderate E. to S. and S.W. gale in advance of the same depression, and at 10 p.m., all remaining eastern stations were warned for a moderate S. to W. and N.W. gale. The depression passed slowly over the Eastern Provinces on the 12th and 13th with somewhat diminished energy, causing a moderate gale from the directions indicated in the Gulf and Bay of Fundy; but other stations reported no storm.

2. At 11 a.m. on the 13th, all stations on Lakes Erie, Ontario, Huron and the Georgian Bay were warned for a moderate storm, on Lake Huron and the Georgian Bay from the E. through N. to N.W. and on Lakes Erie and Ontario from the E. through S. to S.W., in advance of a depression forming over Lake Michigan, which afterwards passed due east, giving a moderate to fresh gale everywhere; the wind in all cases backing through N. to N.W.

3. Port Arthur and Fort William were warned at 10 p.m. on the 14th. for a moderate easterly storm, owing to a depression then over Manitoba, which however passed south and no storm occurred on Lake Superior.

4. At 10 a.m. on the 27th, the above stations were again warned for a strong S.E. gale. There was an important cyclone covering the North-west and Western States. It eventually decreased considerably in energy after giving a strong gale on the western portion of Lake Superior from the eastward.

# TORONTO OBSERVATORY—MAGNETIC REVIEW FOR MAY, 1895.

Mean westerly declination.....	4° 44'9
Mean horizontal force.....	0'16660
Mean vertical force.....	0'60350

On the 1st the force magnets were steady, but the declination was slightly disturbed until after mid-day. On the 2nd small changes of force were recorded, chiefly during the afternoon hours, and the declination was also disturbed, and at 2<sup>h</sup> 11<sup>m</sup> of 3rd a reading of 13'1 west of normal was registered. The horizontal component diminished slightly between 1<sup>h</sup> and 2<sup>h</sup> 3rd, a gradual recovery then set in and at 3<sup>h</sup> it was about normal and the force magnets from this hour until the afternoon of the 5th were very steady. After 22<sup>h</sup> of 4th the declination needle moved gradually towards the east, but by midnight was again perfectly at rest. A small disturbance occurred during the afternoon and evening of the 5th, an increase of the H. F. was registered between noon and 16<sup>h</sup> 15<sup>m</sup>, the movement being greatest at 16<sup>h</sup>, but even then the departure from mean was small. On the 6th and 7th the curves were somewhat irregular, especially during the night hours. From the morning of the 8th until the morning of the 11th the magnets were disturbed, particularly on the 10th, on which day between 4<sup>h</sup> and 8<sup>h</sup> 30<sup>m</sup> a gradual decrease of horizontal force was well marked. The curves of the 11th and 12th were slightly irregular and those of 13th and morning hours of 14th remarkably steady; slight disturbance then began again, and between 14<sup>h</sup> and 16<sup>h</sup> there was an increase of the horizontal component. After this the magnets remained tolerably steady until the morning of the 18th, when at 8 o'clock a gradual decrease of horizontal force began, lasting until 14<sup>h</sup>, when a sudden increase of small extent was registered. After this change a quiet period prevailed until 21<sup>h</sup> 24<sup>m</sup> of the 28th, when the horizontal force abruptly increased and the declination needle was at first deflected west and then to a larger extent to the eastward. The disturbance assumed an important character after 23<sup>h</sup>; at about 23<sup>h</sup> 45<sup>m</sup> the declination magnet took an easterly swing and a marked minimum reading of 22'1 east of normal was recorded at 0<sup>h</sup> 10<sup>m</sup> of 29th; the needle then moved west attaining its westerly extreme at 2<sup>h</sup> 13<sup>m</sup>. By 3<sup>h</sup> the magnet was at about normal position and was but slightly affected up to noon. During this disturbance both components were decidedly below their respective normal values; previous to 1<sup>h</sup> both diminished rapidly, the horizontal showing a marked minimum at 2<sup>h</sup> 17<sup>m</sup>, the reading being 0'0027 C.G.S. below normal. After reaching its minimum reading, a few sharp swings of the magnet were recorded and then a gradual recovery set in and by 4<sup>h</sup> it was steady. The vertical force minimum occurred later than the horizontal by some fifteen minutes, it also gradually returned to normal value and was steady by 5<sup>h</sup>. The curves showed slight irregularities on the afternoon of the 29th, on the 30th and again on afternoon of the 31st, the changes were more marked on the declination curve, the bifilar being but slightly affected.

Aurora Class IV evening of the 28th. On the 2nd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 12th, 16th, 17th, 20th, 23rd, 24th, 26th, 27th, 29th, 30th and 31st the sky was clear, but no aurora was observed on all other nights; clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, September, 1895.

# METEOROLOGICAL SERVICE, DOMINION OF CANADA.

## Monthly Weather Review.

JUNE, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SYNOPSIS OF THE WEATHER.

The chart of mean atmospheric pressure for June shows the pressure to have been from .050 inches to .180 inches above the average throughout the continent, the greatest departures being over our Atlantic and Gulf of St. Lawrence coasts, and from the North Saskatchewan Valley south-eastward into Utah. Temperature was  $1^{\circ}$  to  $5^{\circ}$  above average in Canada east of Lake Superior. In the North-west Territories and Manitoba on the other hand it was from  $1^{\circ}$  to  $7^{\circ}$  below average, and in British Columbia about average. In the Middle and Northern United States it was above average, but elsewhere nearly everywhere below.

The low pressure areas were on the whole unimportant, and their tracks were so often doubtful that no accurate mean rate of travel can be given.

The distinctive features of June were the unusually large number of days on which rain fell in the North-west Territories and Manitoba, and the severe drought which prevailed in Ontario, as well as in Prince Edward Island and the eastern portion of Nova Scotia.

During the first three days of the month there were numerous showers in the North-west Territories and Manitoba, and some of these were quite heavy, at the same time the weather from the Lakes to the Atlantic was fine with the exception of a few scattered showers or thunderstorms more particularly confined to the Ottawa Valley and its immediate neighbourhood. It was also extremely warm over Ontario, the daily maxima being much over  $90^{\circ}$  in the shade in nearly all places.

A moderately deep disturbance, which at first moved from the South-west States to Lake Superior, then passed eastward to the Gulf of St. Lawrence, and between the 4th and 6th it brought showers and thunderstorms from the Lakes to the Atlantic, but the rainfall was apparently nowhere heavy. At the same time the winds increased to strong breezes and moderate gales from the south and west in many portions of the St. Lawrence and the Maritime Provinces; strong westerly breezes also prevailed on the Lakes, but they hardly reached the force of moderate gales.

The 4th was a fine day from the Rockies to Manitoba, but during the evening of the 5th, as well as on the 6th, 7th, 8th and 9th, showers and thunderstorms were very general, a noticeable feature being that they were apparently just as numerous when the pressure was high as they were on the 5th and 6th, when it was low.

From the Lakes to the Atlantic, after the passage of the depression, the weather for some little time was fine, the distribution of pressure was anti-cyclonic and the winds as a rule were light or moderate, whilst temperature in nearly all localities was much above the average.

The pressure gave way generally on the 12th, and the weather became for the most part unsettled, and between this date and the 14th, showers and thunderstorms were recorded in all districts, but apparently they were more general and heavy in the St. Lawrence Valley and the Gulf than elsewhere.

Another rather lengthy period of anti-cyclonic conditions and fine weather which ensued, was broken in a measure on the 19th and 20th in the Lake Region by the advent of a few local showers or thunderstorms. In Quebec it gave way to heavy rains on the 21st, the rainfall amounting to nearly two inches in some places; on the 22nd and 23rd also there were more heavy showers in Quebec. In the Maritime Provinces the interruption to the fine weather was not generally marked until the 23rd, when showers occurred in most places; on the previous day, however, they had been experienced in many parts of New Brunswick.

On the 24th there were a few scattered showers from the Lakes to the Atlantic, and on the 25th it rained heavily along the South-western Nova Scotian Coast. The 26th was still unsettled in the Maritime Provinces, with light local rains, and at the same time there were showers or thunderstorms over the Lake Region, but the rainfall was quite light.

The 27th and three following days were generally fine in the Lake Region, attended by light winds and calms, but in the St. Lawrence Valley, between the 27th and 29th, whilst the depression which had given the showers over the Lakes on the 26th was hovering there quickly filling up, it rained frequently and in most places heavily. In the Maritime Provinces the weather still remained somewhat disturbed until the night of the 30th, although the showers experienced were for the most part very light.

In the North-west Territories and Manitoba, after the 9th and until the end of the month, with the exception of the 10th, 29th and 30th, rain fell, in some parts of the country herein embraced, daily, and not by any means locally or in small quantities, in fact the showers were generally very widespread and heavy and the thunderstorms were also very numerous. The weather was on the whole cool, no great heat was at any time recorded and temperature was much below the average. The distribution of pressure was almost entirely cyclonic, and on the 19th, 26th and 27th, when it was anti-cyclonic, there was no marked cessation of the wet period, as showers were still experienced in many localities. Outside of the 15th, 16th and 24th, no very high winds were recorded.

In British Columbia, in some portions of the mainland, the rainfall was excessive, but Vancouver Island suffered greatly from drought. No floods occurred from the spring freshets, and the high water on the Thompson River is reported to have been the lowest on record.

#### TEMPERATURE.

In British Columbia the mean temperature was from 2° to 4° above the average. In the North-west Territories it varied from the average to 5° and in some cases as much as 7° below. In Manitoba it was from 2° to 6° below. In Ontario, Quebec and the Maritime Provinces it ranged from 2° to 5° above the average.

*The Highest and Lowest Temperature in each Province during June were :*

British Columbia, 100°·0 on 27th at Spence's Bridge, 21°·0 on 5th at Stuart's Lake.

North-west Territories, 97°·0 on 30th at Battleford, 26°·2 on 8th at Prince Albert.

Manitoba, 88°·0 on 16th at Portage la Prairie, 30°·0 on 10th at Oakbank.

Ontario, 100°·0 on 4th and 11th at Thorold, 28°·0 on 12th at Bancroft.

Quebec, 91°·4 on 19th at Chicoutimi, 30°·0 on 22nd at Bicquet.

New Brunswick, 96°·0 on 19th at Chatham, 37°·5 on 4th at Dalhousie; on 9th at Fredericton.

Nova Scotia, 91°·5 on 19th at Sydney, 28°·4 on 4th at Sydney.

Prince Edward Island, 87°·3 on 19th at Georgetown, 38°·0 on 3rd at Georgetown.



PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT ALL STATIONS IN THE DOMINION OF CANADA, JUNE, 1895.

\* Stations not furnished with Registering Thermometers.

[illegible]



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## PRECIPITATION.

The rainfall in British Columbia has on the coast been considerably below the average, further inland the amount is greater. In the North-west Territories and Manitoba it was slightly below the average. In Ontario the quantity was in many cases less than half the average, but in the north-west parts and in part of the eastern some heavy rains occurred. In Quebec it was above the average, and in the Maritime Provinces the amount was very small.

*The General Distribution is as follows :—*

In British Columbia the rainfall was in general 1·39 in., or about 1·48 below 1894.

In the North-west Territories, 2·42 in., about 0·40 in. below the average.

In Manitoba the rainfall was 3·42 in., or 0·28 in. below the average.

In Ontario, West and South-west District, it was 1·19 in., or 1·80 in. below the average. In the North and North-west District it was 1·86 in., or 0·74 in. below the average. In the Central District it was 1·09 in., or 1·35 in. below the average; and in the East and North-east District it was 1·35 in., or 0·03 in. below the average.

In Quebec it was 3·87 in., or 0·90 in. above the average.

In New Brunswick it was 2·07 in., or 1·46 in. below the average.

In Nova Scotia it was 1·15 in., or 2·14 in. below the average.

In Prince Edward Island it was 0·64 in., or 2·40 in. below the average.

*Rain all 5 inches and upwards during the month :—*

BRITISH COLUMBIA—Rivers Inlet, 5·00 in.; Port Simpson, 5·30 in.; Glacier, 5·05 in.

MANITOBA—Foxton, 5·05 in.; Greenwood, 5·28 in.; Hartney, 6·54 in.; Stony Mountain, 6·83 in.

ONTARIO—Ottawa, 5·65 in.

QUEBEC—Quebec, 5·20 in.; Cape Magdalen, 5·35 in.; Anticosti, S.W.P., 5·82 in.

*Rain 1 inch and upwards in 24 hours :—*

1. Channel Island, 1·05 in.

3. Deseronto, 1·18 in.

4. Ottawa, 1·60 in.

5. Richmond, 1·17 in.

7. Cape Magdalen, 3·10 in.

8. Bermuda, 1·94 in.

9. Savanne, 1·20 in.; Stony Mountain, 1·40 in.

11. White River, 1·15 in.

12. Owen Sound, 1·29 in.; Midland, 1·20 in.

13. Welland, 1·05 in.

14. Dalhousie, 1·19 in.; Pincher Creek, 1·32 in.; Mellendean, 1·02 in.; Anticosti, W.P., 1·02 in.; Banff, 1·04 in.

15. Indian Head, 1·55 in.; Pincher Creek, 1·63 in.; Foxton, 1·22 in.; Cape Magdalen, 1·60 in.; Banff, 1·00 in.

16. Portage la Prairie, 2·11 in.; Mellendean, 2·02 in.; Foxton, 1·72 in.; Beaver Creek, 1·68 in.; Hartney, 1·15 in.; Cartwright, 1·63 in.; Cartwright (2), 2·48 in.; Treherne, 2·41 in.

17. Greenwood, 1·33 in.; Norquay, 1·92 in.

18. Bermuda, 1·80 in.

19. Wiarton, 1·25 in.; Bermuda, 1·16 in.

22. Nottawasaga Island, 1·00 in.

23. Point des Monts, 1·00 in.; Fredericton, 1·08 in.; Chatham, 1·23 in.

24. Indian Head, 1·05 in.; Anticosti, W.P., 1·25 in.; Sable Island, 1·05 in.

26. Nottawasaga Island, 1·00 in.; Ottawa, 2·27 in.; Woodstock, 1·45 in.; Halifax, 1·08 in.

27. Collingwood, 1·80 in.

*Thunder recorded on :*

1. Whiteside, Wilton Grove, Norquay, Rosberry, Father Point, Parry Sound, Chicoutimi.

2. North Bay, Point Clark, Bognor, Picton, New Glasgow, Coldstream, Wiarton, Presque Isle, Lion's Head, Georgina, Owen Sound, Orillia, Georgetown, Coldwater, Lindsay, Ottawa, Charlotte-town, Edmonton, London, Haileybury, Toronto, Barrie.

3. Mattawa, Whiteside, Beatrice, Georgetown, Aurora, Gravenhurst, Burk's Falls, Deseronto, Woodstock, Kingston.

4. Welland, Mattawa, Peterborough, Cottam, Bancroft, Georgetown, Coldstream, Stratford, Blenheim, Wiarton, Scarborough, Wyoming, Birnam, Lakefield, St. Anns, St. Mary's, Stony Creek, Orillia, Ottawa, Montreal, London, Alton.
5. Welland, Griffin Lake, Hillview, Brandon, Pincher Creek, Deseronto, Calgary, Elkhorn.
6. Pelee Island, Pembina Crossing, Treherne, Emerson.
7. Bancroft, Loch Erroch, Norquay, Bermuda, Port Arthur.
8. Pelee Island, Bancroft, Bermuda.
9. Pelee Island, Savanne, Portage la Prairie, Georgetown, P.E.I.
10. Bancroft, Barkerville, Oakbank, Calgary
11. Bancroft, Point Escuminac, Moose Jaw, Oakbank, Georgetown, P.E.I., Father Point, Swift Current, Port Arthur, Medicine Hat, Emerson.
12. Mattawa, Uplands, Spence, Paris, Whiteside, Point Clark, Bancroft, Beatrice, Bognor, Dalhousie, Georgetown, Wiarton, Wyoming, Midland, Presqu'Isle, Birnam, Georgina, Lucknow, Niagara, St. Anns, Owen Sound, St. Mary's, Gravenhurst, Moose Jaw, Qu'Appelle, Montreal, Chicoutimi, Toronto, Pipestone, Pense, Georgetown, P.E.I., Bathurst, Ottawa, Durham, Parry Sound.
13. Welland, Mattawa, Peterborough, Clontarf, Point Clark, Brome, Richmond, Georgetown, Port Rowan, Niagara, St. Mary's, Brantford, Burk's Falls, Moose Jaw, Shoal Lake, Moose Jaw (2), Calgary, Bathurst, Ottawa, Deseronto, Father Point, Montreal, Chicoutimi, Toronto, Quebec, Grindstone, Port Stanley, Anticosti, S.W.P., Kingston, Prince Albert.
14. Pelee Island, Whiteside, Point Clark, Beatrice, Brome, Sprucedale, Haliburton, Niagara, Gravenhurst, Burk's Falls, Moose Jaw, Oakbank, Hillview, Shoal Lake, Mellendean, Turtle Mountain, Pembina Crossing, Belmont, Treherne, Carman, Pictou, Ottawa, Fredericton, St. John, Quebec, St. Andrews, Rockcliffe, Rathwell, Portage la Prairie, Pincher Creek, Cannington Manor, Alameda, Minnedosa, Elkhorn, Alton.
15. Donald, Moose Jaw, Hillview, Cartwright, Turtle Mountain, Pembina Crossing, Belmont, Brandon, Portage la Prairie, Pense, Cannington Manor, Alameda, Edmonton, Minnedosa, Qu'Appelle, Elkhorn, Alton.
16. Pelee Island, Kamloops, Griffin Lake, Oakbank, Hillview, Norquay, Mellendean, Pembina Crossing, Belmont, Treherne, Carman, Rathwell, Portage la Prairie, Pincher Creek, Minnedosa, Medicine Hat.
17. Pelee Island, Donald, Mellendean, Pembina Crossing, Carman, Rathwell, Calgary, Elkhorn.
18. Kaslo, Pilot Bay, Savanne, Oakbank, Hillview, Norquay, Mellendean, Pembina Crossing, Pincher Creek, Calgary, Swift Current, Medicine Hat.
19. Waterford, Port Rowan, St. Anns, Stony Creek, Gravenhurst, Moose Jaw, Hillview, Toronto, Pembina Crossing, Belmont, Brandon, Calgary, Swift Current, Medicine Hat, Alton.
20. Parker's Ridge, Dalhousie, Savanne, Moose Jaw, Oakbank, Norquay, Pense, Swift Current, Medicine Hat.
21. Pelee Island, Lakefield, Pembina Crossing, Brandon, Duck Lake, Father Point, Quebec, Edmonton, Minnedosa, Montreal, London.
22. Spence, Whiteside, Point Clark, Bancroft, Beatrice, Dalhousie, Georgetown, Midland, Thedford, Haliburton, St. Mary's, Gravenhurst, Moose Jaw, Oakbank, Mellendean, Selkirk, Turtle Mountain, Pembina Crossing, Belmont, Treherne, Rathwell, Duck Lake, Stratford, Lindsay, Ottawa, Durham, Rockcliffe, Prince Albert, Brandon, Portage la Prairie, Henrietta, Moose Jaw (2), Cannington Manor, Emerson, Qu'Appelle, Elkhorn, Alton, Barrie.
23. Paris, Cottam, Kaslo, Griffin Lake, Cowal, Moose Jaw, Norquay, Mellendean, Cape Chatte, Pilot Mound, Pembina Crossing, Carman, Pincher Creek, Henrietta, Alameda, Father Point, Quebec, Edmonton, Medicine Hat, Qu'Appelle, Elkhorn, Chicoutimi.
24. Welland, Pelee Island, Cottam, Bognor, Parker's Ridge, Coldstream, Wilton Grove, Birnam, Port Rowan, Oakbank, Hillview, Norquay, Mellendean, Pincher Creek, Duck Lake, Georgetown, P.E.I., Bathurst, Fredericton, Port Stanley, Edmonton, Qu'Appelle, London.
25. Georgetown, Scarborough, Gravenhurst, Mellendean, Pembina Crossing, Pincher Creek, Pense, Alameda, Swift Current, Medicine Hat, Emerson, London.
26. North Bay, Pelee Island, Uplands, Whiteside, Clontarf, Cottam, Point Clark, Denbigh, Beatrice, Bognor, Mount Forest, Georgetown, Princeton, Coldstream, Blenheim, Huntsville, Lion's Head, Midland, Wilton Grove, Thedford, Presqu'Isle, Birnam, Brantford, Stony Creek, Burk's

Falls, Norquay, Pembina Crossing, Treherne, Sprucedale, Georgina, Lucknow, Haliburton, Niagara, Owen Sound, St. Mary's, Parry Sound, Rockliffe, Banff, Emerson, London, Haileybury, Toronto, Rathwell, Moose Jaw (2), Stratford, Lindsay, Ottawa, Port Stanley, Saugeen, Alton, Barrie.

27. Blenheim, Wiarton, Wilton Grove, Lakefield, Oakbank, Norquay, Mellendean, Deseronto, Woodstock, Montreal.

28. Point Clark, Agassiz, New Westminster, Chilliwack, Stuart's Lake, Langley, Georgetown, Coldstream, Cowal, Wyoming, Wilton Grove, St. Mary's, Oakbank, Pembina Crossing, Belmont, Treherne, Rathwell, St. Albans, Brandon, Portage la Prairie, Durham, Port Stanley, Winnipeg, Emerson, Elkhorn, Chicoutimi, Haileybury, Alton.

29. Kamloops, Salt Spring Island, Loch Erroch, Kaslo, Hazlemere, Griffin Lake, Oakbank, Norquay, Carman, Woodstock, Spence's Bridge, Father Point, Quebec, Emerson, Chicoutimi.

30. Beatrice, Pilot Bay, Point Escuminac, Quebec, Medicine Hat.

*Frost (when not mentioned by observer the record of 32° or below is taken):—*

1. Princeton 30°, Salmon Arm 30°, Rivers Inlet.

2. Donald 30°, Pipestone 31°.

3. Port Hastings 32°, Cape Norman 31°.

5. Quesnelle 29°, Barkerville 29, Stuart's Lake 21°, Barclay 30°.

6. Savanne 29°, White River.

7. Uplands 30°, Spence 32°, Clontarf 31°, Donald 30°, Birnam, Sprucedale 29°, Sarnia 32°.

8. Peterborough, *slight*, Fort Steele 29°, Duck Lake 28°, Calgary 30°, Oonikup 29°, Edmonton,

Prince Albert, Calgary, Banff.

9. Pincher Creek 30°, Swift Current, Banff.

10. Chilicotin 32, Oakbank 30°, Hillview.

12. Bancroft 28°.

14. Banff, *snow*.

15. Spence 32°, Pincher Creek, *snow*, Banff, *snow*.

16. Banff.

18. Donald 31°.

21. Griffin Lake 29°.

22. Biequet 30°.

23. Chaplin.

27. Moose Jaw 30°, Hillview 32°, Turtle Mountain, Alameda 27°, Duck Lake 28°.

29. Sault Ste. Marie 32°, Savanne, potatoes frozen, Alameda 27°.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I), being the brightest, (II'), the feeblest in brilliancy.*

1. Savanne, Hillview, III.; Emerson, IV.; Montreal.

2. Savanne, Hillview, III.; Portage la Prairie.

4. Cape Norman, II.

5. Gravenhurst, IV.; Port Rowan.

6. Georgetown, IV.; Durham, IV.; Montreal.

8. Pembina Crossing, III.

9. Channel Island, III.

10. Gravenhurst, IV.; Hillview, IV.; Georgetown, IV.; Cape Magdalen, Truro, IV.

11. Hillview, IV.

12. Savanne, Channel Island, IV.

13. Georgetown, Minnedosa, III.

14. Savanne, Port Dover, Portage la Prairie, Georgetown, IV.; Durham, IV.

15. Moose Jaw.

16. St. Albans, III.; Shoal Lake, III.; Ottawa, Quebec, IV.; Haileybury, IV.

17. Pembina Crossing, II.; Georgetown, IV.; Point Escuminac, II.; Ottawa, Father Point III.; Quebec, IV.; Minnedosa, IV.; Haileybury, IV.

18. Moose Jaw, Hillview, IV.; Pembina Crossing, III.; Father Point, IV.; Emerson, III.

19. Port Dover, Pembina Crossing, IV.

20. Treherne, II.; Montreal, Haileybury, IV.

21. Pembina Crossing, IV.

22. Duck Lake, II.; Savanne.  
 24. Georgetown, P.E.I., Haileybury, III.  
 25. Thompson, Haileybury, II.  
 26. Moose Jaw, Savanne.  
 27. Haileybury, III.  
 28. Gravenhurst, III.; Channel Island, III.; Cape Norman, II.; Medicine Hat, IV.  
 Haileybury, III.  
 29. Moose Jaw, Gravenhurst, III.; Portage la Prairie, Thedford, III.; Fort Steele, IV.  
 Rockliffe, IV.; Point Escuminac, Cape Chatte, Durham, IV.; Father Point, III.; Quebec, IV.  
 Medicine Hat, IV.  
 30. Gravenhurst, II.; Ottawa, Haileybury, II.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF JUNE, 1895.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON.	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT.....	..	0 03	0 13	0 26	0 49	0 60	0 63	0 77	0 76	0 74	0 70	0 55	0 63	0 57	0 54	..
KUPER ISLAND.....	..	08	36	51	56	61	67	92	61	59	59	55	56	48	34	..
AGASSIZ, B. C.....	..	05	25	33	35	41	49	52	54	59	51	51	43	29	05	..
INDIAN HEAD.....	..	07	28	34	40	42	52	58	55	60	48	44	52	38	32	0 03
BRANDON.....	..	11	30	40	39	43	53	56	64	59	55	56	53	46	31	0 01
WINNIPEG.....	8	27	30	33	35	42	50	51	54	59	52	54	50	51	46	0 08
WOODSTOCK.....	..	14	64	83	86	87	81	76	76	74	72	72	69	62	40	..
TORONTO.....	..	31	74	74	83	80	77	77	77	75	72	71	71	63	25	..
LINCOLN.....	04	24	46	67	70	77	77	73	79	76	73	72	65	62	54	0 25
BARRIE.....	8	31	66	74	80	77	78	79	73	75	73	74	71	61	32	..
KINGSTON.....	..	37	66	69	76	75	83	78	78	84	81	70	63	57	34	0 02
MONTREAL.....	16	65	72	69	73	76	76	80	73	72	67	50	51	12	..	..
FREDERICTON.....	8	24	41	44	46	47	59	55	60	69	66	62	57	42	34	0 08
<hr/>																
		ESQUIMALT.	KUPER ISLAND.	AGASSIZ.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINCOLN.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.		
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)		0 44	0 44	0 36	0 36	0 40	0 49	0 64	0 61	0 60	0 60	0 62	0 63	0 45		
MAXIMUM DAILY AMOUNT.....		0 77	0 83	0 83	0 99	0 61	0 57	0 88	0 86	0 98	0 90	0 89	0 97	0 99		
DATE.....		7	6	25	4	26	5	27	3	9	9	9	29	8		
NO. OF DAYS COMPLETELY CLOUDED.....		3	3	4	5	3	2	0	0	0	0	0	1	6		

# PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 563. These were divided as follows :—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully.	No. Partly.	No. No.	Percentage.
ONTARIO .....	81	50	29	11	74.1
NORTH-WESTERN LAKE REGION .....	106	84	13	9	85.4
NORTH-WESTERN ST. LAWRENCE .....	92	71	13	8	84.2
NORTH-WESTERN ST. LAWRENCE .....	88	58	15	15	74.4
NEW-FUNDLAND .....	91	66	19	6	83.0
ATLANTIC PROVINCES .....	105	80	17	8	84.3
TOTAL .....	563	409	97	57	81.3

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions, the reports from all observing stations in Canada are used.

No warnings were issued.

## TORONTO OBSERVATORY—MAGNETIC REVIEW FOR JUNE, 1895.

Mean westerly declination .....	4° 44' 3
Mean horizontal force .....	0.16659
Mean vertical force .....	0.60301

A very slight disturbance which prevailed during the 1st became rather more pronounced on the 2nd, on which day the declination curve shewed small undulations, particularly between 0<sup>h</sup> and 4<sup>h</sup>, and again after 16<sup>h</sup>; the force curves shewed greatest disturbance between 14<sup>h</sup> and 19<sup>h</sup>. On the 3rd and 4th all the curves were irregular, the declination particularly so after 19<sup>h</sup> on the 3rd and again during the morning hours of the 4th. The 5th and greater part of the 6th were less disturbed, but all curves again shewed decided irregularities between 16<sup>h</sup> and midnight, after which the disturbance gradually passed off. On the night of the 10th there was a slight disturbance and a little previous to 11<sup>h</sup> 5<sup>h</sup> a gradual swing of the declination magnet was registered, but by 6<sup>h</sup> was again at normal position. After this, with the exception of slight irregularities on the curves of the 22nd and 23rd, there was no disturbance until the night of the 29th and during the 30th when between 0<sup>h</sup> and 4<sup>h</sup> and again between 21<sup>h</sup> and midnight the declination curve was decidedly irregular with, however, no great departures from normal. The horizontal force magnet was slightly disturbed between 14<sup>h</sup> and 16<sup>h</sup> and the vertical force after 21<sup>h</sup>.

On the 1st, 3rd, 6th, 7th, 8th, 9th, 10th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 27th, 28th the sky was clear but no aurora was observed; on all other nights clouds would have hidden any aurora which might have existed.

R. F. STUPART,

*Director.*

METEOROLOGICAL OFFICE,

Toronto, October, 1895.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

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# Monthly Weather Review.

JULY, 1895.

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### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SYNOPSIS OF THE WEATHER.

The atmospheric pressure was above the average, to the extent of '05, along the Middle Pacific Coast and over the Middle Eastern slope of the Rocky Mountains. It was below average to the extent of '05 over the Middle Atlantic Coast. Everywhere else it was average or very nearly so.

The temperature was slightly above the average over the Northern portions of Alberta and Manitoba, also over Nova Scotia and Eastern New Brunswick. It was below to the extent of 5° over the South-west States and Western California. Everywhere else it was slightly below the average. There were several unimportant low areas whose tracks were too doubtful to give their average rate of travel. Of four depressions, the paths of which could be determined, the average rates of travel were 23, 39'6, 36'6 and 18'2 miles per hour respectively.

1st—5th. An anticyclone hovered during this period over the central portion of the continent, covering the Lakes and extending gradually throughout Eastern Canada. It was attended by very fine warm weather, with winds for the most part moderate or light. On the other hand, in the North-west, the pressure was generally low and there were numerous thunderstorms, and the temperature was excessive, often exceeding 90° in most districts.

6th—10th. Lower pressure which had begun to set in on the 5th, from the Lakes eastward was soon general throughout, from Manitoba south to the Gulf of Mexico and eastward to the Atlantic Coast. The weather continued fair, however, with the exception of some local showers, and temperatures were generally high throughout Ontario, Quebec and New Brunswick, reaching at Toronto on the 7th, a maximum of 92° and next day 88° at Montreal and 90° at Quebec.

The low pressure area became more contracted on the 8th, and by the 9th covered the Lakes, Eastern Canada and the Eastern States. Still contracting it passed eastward, moving off the coast on the 10th. It caused brisk W. and N.W. winds over the Lakes and Quebec on the 9th, and a general drop in temperature took place. Winds also shifted on the 10th to W. and N.W. through Eastern Canada, accompanied by lower temperature in Quebec and New Brunswick. There were a few showers in Ontario on the 8th and in the Maritime Provinces on the 9th, otherwise the weather remained fair everywhere.

11th—14th. Fair weather continued until the 12th, when a slight depression passed over Ontario causing local showers and thunderstorms there, and later on in Quebec and the Maritime Provinces. Pressure then became high from the Lakes to the Atlantic, accompanied by fine pleasant weather, which continued until the 15th.

During the same period a general depression covered the North-west and local showers and thunderstorms were of frequent occurrence.

15th—18th. On the 15th a general decrease in pressure took place over the Lake District, the depression from the North-west having extended eastward, and stretching from the Rocky Mountains to the Gulf of St. Lawrence, when thunderstorms and showers became general over Ontario. Some showers also occurred in Western Quebec on the 16th.

Next day the extensive depression had contracted and appeared as a smaller low area over Ontario. It then passed eastward, giving showers in Eastern Canada on the 17th.

High pressure succeeded over the North-west on the 17th, with fair comparatively cooler weather, but next day a depression over the Western States extended its northern limits to the North-west District and caused that night and the following day a general rainfall throughout the North-west, which was excessive in many places, 2.24 in. falling at Calgary, 2.31 in. at Medicine Hat, 1.27 at Swift Current and 1.17 at Winnipeg.

19th—24th. The last mentioned depression dispersed over the lakes on the 19th after giving some local rains and thunderstorms in Ontario that day. The weather continued fine and warm in Eastern Canada and cleared up in Ontario on the 20th.

In the meantime, on the 19th, another depression had developed over the Middle Western States, the northern limits of which affected Assiniboia and Manitoba, causing a general fall of rain in these districts and a continuance of cool weather. There were also some showers in Alberta owing to another slight depression there.

The depression from the Middle Western States reached the Lakes on the 21st, where it was the cause of local showers and thunderstorms. From thence it passed to the Atlantic Coast, giving a few local showers in Eastern Canada.

Higher pressure set in over the North-west on the 20th and extended to the Lakes on the 22nd, accompanied by generally fine weather.

The last mentioned depression hovered over the Gulf of St. Lawrence, and on the 24th there was a general decrease in pressure from the Lakes to the Gulf of St. Lawrence, and local showers occurred with unsettled weather in many places, while another low area was moving over Alberta giving local thunderstorms in that district.

25th—31st. During the 25th a general decrease in pressure took place throughout, from the Rockies to the Atlantic, showers fell in many places, more especially in Manitoba and Eastern Canada.

On the 26th pressure recovered itself somewhat over the North-west and the weather became fair, but a low area was approaching the Lakes from the west and on the 27th it reached the Lakes, where a general rainfall set in. This soon extended to Quebec, and on the 28th it passed to the Gulf of St. Lawrence, causing a general fall of rain also throughout Eastern Canada. Unsettled weather continued in the Lake district and Quebec, for a subsidiary depression which moved south-eastward from Lake Superior developed on the 29th causing rain and local thunderstorms in Ontario on that day, the rain in some places being excessive. Next morning it had developed into a depression of some importance, being then central near Montreal. Rain soon extended throughout Quebec and a moderate N.W. gale was blowing over the Lakes. On the 31st it caused heavy rain at most places in New Brunswick and Nova Scotia, the unsettled weather continuing over Quebec and Ontario with high N.W. winds over Ontario until the end of the month.

After the 20th the weather was generally fair in the North-west, with the exception of a few local showers in Assiniboia and Manitoba on the 27th and 28th and a heavy thunderstorm and rain at Winnipeg on the 28th.

Higher pressure with fine weather set in over Manitoba on the 29th and continued until the end of the month. Further west, however, the pressure remained low, the weather continuing fine.

In British Columbia during the month a deficiency in rain caused extreme drought in Vancouver, but on the mainland the rainfall was for the most part larger than usual, so that where irrigation had been generally used, it was not found necessary.

The principal features of the month were the high temperatures of the 10th and 11th, when a temperature of  $101^{\circ}$  was reported in Lillooet and  $100^{\circ}$  at Spence's Bridge; also on the 24th and 25th, when temperatures from  $90^{\circ}$  to  $100^{\circ}$  were general.

#### TEMPERATURES.

*The Highest and Lowest Temperature in each Province during July were :*

British Columbia,	$100^{\circ} 0$ on 11th at Spence's Bridge,	$28^{\circ} 7$ on 3rd at Stuart's Lake.
North-west Territories,	$104^{\circ} 0$ on 2nd at Moose Jaw,	$32^{\circ} 0$ on 18th at Duck Lake.
Manitoba,	$92^{\circ} 5$ on 2nd at Brandon,	$33^{\circ} 5$ on 17th at Hillview.
Ontario,	$98^{\circ} 0$ on 10th at Cottam,	$30^{\circ} 0$ on 14th at Durham; and on 1st at Spence.
Quebec,	$92^{\circ} 0$ on 8th at Richmond,	$37^{\circ} 0$ on 11th at Brome.
New Brunswick,	$96^{\circ} 0$ on 4th at Chatham,	$30^{\circ} 0$ on 4th at Parker's Ridge.
Nova Scotia,	$88^{\circ} 3$ on 8th at Truro,	$36^{\circ} 3$ on 4th at Truro.
P. E. Island,	$85^{\circ} 3$ on 9th at Georgetown,	$49^{\circ} 0$ on 15th at Georgetown.
Newfoundland,	$87^{\circ} 0$ on 9th at St. John's,	$41^{\circ} 0$ on 8th at Cape Norman.





PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT ALL STATIONS IN THE DOMINION OF CANADA, JULY, 1895.

1. Parameter not reduced to Sea Level. \* Stations not furnished with Registering Thermometers.

[illegible]



## PRECIPITATION.

The rainfall throughout the Dominion with the exception of P. E. Island, Manitoba and the N. W. Territories has been much below the average, the greatest deficiency occurring in parts of British Columbia and in Western and North-western Ontario.

*The Distribution is as follows :—*

In British Columbia it was 1·02 in., or 0·31 in. below the average.

In the North-west Territories, it was 3·31 in., or 0·60 in. above the average.

In Manitoba it was 3·74 in., or 0·74 in. above the average.

In Ontario, West and South-west District, it was 2·04 in., or 1·42 in. above the average. In the North and North-west District it was 1·56 in., or 1·20 in. below the average. In the Central District it was 2·28 in., or 0·44 in. below the average; and in the East and North-east District it was 2·21 in., or 0·70 in. below the average.

In Quebec it was 2·35 in., or 1·20 in. below the average.

In New Brunswick it was 3·44 in., or 0·48 in. below the average.

In Nova Scotia it was 3·34 in., or 0·38 in. below the average.

In Prince Edward Island it was 4·76 in., or 0·70 in. above the average.

*Rainfall 5 inches and upwards during the month :—*

N. W. TERRITORIES—Calgary, (2) 5·05 in.

MANITOBA—Hartney, 5·24 in.; Rathwell, 6·74 in.

NOVA SCOTIA—Sable Island, 6·28 in.

P. E. ISLAND—Georgetown, 6·06 in.

BERMUDA—Prospect, 6·51 in.

*Rain 1 inch and upwards in 24 hours :—*

1. Halifax, 1·78 in.; Regina, 1·58 in.; Georgetown, P.E.I., 1·20 in.

4. Amour Point, 1·66 in.

5. Pilot Mound, 1·35 in.; Pembina Crossing, 1·18 in.; Treherne, 1·00 in.; Cartwright, 1·27 in.; Hillview, 2·54 in.; Moose Jaw, 1·06 in.; Pense, 1·00 in.

6. Battleford, 1·02 in.; Swift Current, 1·17 in.; Qu'Appelle, 1·80 in.; Turtle Mountain, 2·86 in.; Hartney, 1·20 in.; Rapid City, 1·55 in.; Treherne, 1·11 in.; Greenwood, 1·57 in.; Alameda, 1·85 in.; Duck Lake, 1·25 in.; Henrietta, 2·16 in.; Indian Head, 2·0 in.; Brandon, 1·67 in.; Pipestone, 1·15 in.; Portage la Prairie, 1·24 in.

7. Norquay, 1·01 in.; Rathwell, 3·14 in.; Beaver Creek, 2·50 in.; St. Albans, 1·28 in.; Fort Francis, 1·18 in.

9. Pense, 1·02 in.

10. Sable Island, 3·36 in.; St. John, 1·08 in.

11. Whitehead, 1·00 in.

15. Presqu'Isle, 1·20 in.; Cape Chatte, 1·22 in.

17. Banff, 1·80 in.; Calgary, 1·32 in.; Sable Island, 1·02 in.; Rosebank, 1·05 in.; Calgary, 1·61 in.

18. Winnipeg, 1·12 in.; Pilot Mound, 1·37 in.; Roseberry, 1·02 in.; Pembina Crossing, 1·14 in.; Rathwell, 1·47 in.; Treherne, 1·21 in.; Oakbank, 1·44 in.

19. Carman, 1·26 in.

21. Oliver's Ferry, 1·05 in.; Sunshine, 1·31 in.

22. Lakesfield, 1·50 in.

24. Rivers Inlet 1·07 in.; Charlottetown, 1·16 in.; Georgetown, P.E.I., 1·10 in.

25. Shoal Lake, 1·30 in.

26. Cottam, 1·28 in.

27. Port Dover, 1·43 in.; Port Rowan, 1·02 in.

28. Chatham, 1·00 in.; Bathurst, 1·40 in.; Parker's Ridge, 2·18 in.; Anticosti, W. P., 1·67 in.;

Bancroft, 1·73 in.

29. St. Johns, 1·30 in.; Anticosti, S.W.P., 1·02 in.

30. Ottawa, 1·42 in.; Montreal, 1·24 in.

31. Amour Point, 1·00 in.

# PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER.

	RAINFALL.					RAINFALL.			
	Amount in inches.	No. of Fair Days.	Heaviest Fall in Month.	Day.		Amount in inches.	No. of Fair Days.	Heaviest Fall in Month.	Day.
<b>BRITISH COLUMBIA—</b>					<b>ONTARIO—</b>				
Nanaimo.....	0 55	28	0 26	5	Thompson.....	0 92	27	0 31	5
Goldstream.....	0 56	26	0 26	5	Ennismore.....	2 23	26	0 62	16
Salt Spring Island.....	0 22	29	0 11	5	Blenheim.....	2 48	25	0 82	15
Enderby.....	0 16	29	0 13	3	Wyanong.....	1 16	24	0 45	15
Quamichan.....	0 61	23	0 28	5	Presqu'Isle.....	1 74	34	1 30	15
Nicola Lake.....	0 87	25	0 55	29	Princeton.....	2 16	32	0 50	21
Beaver Creek.....	1 05	32	0 44	4	Wilton Grove.....	1 57	26	0 46	26
Union.....	1 09	35	0 55	4	Scarborough.....	2 84	18	0 50	25
Langley.....	0 71	32	0 33	16	Warton.....	0 34	27	0 12	21
					Coldstream.....	1 57	24	0 38	15
<b>ASSINBOIA—</b>					Pendleigh.....	2 13	25	0 42	21
Pense.....	4 71	21	1 34	1	Dealtown.....	3 34	25	0 36	15
					Orangeville.....	2 22	23	0 50	28
<b>MARITIMES—</b>					Mount Forest.....	1 29	24	0 45	15
Foxton.....	2 60	25	0 95	6	Lion's Head.....	0 73	28	0 27	21
Pilot Mound.....	3 80	33	1 37	18	Deer Park.....	2 49	23	0 75	29
Turtle Mountain.....	4 99	23	2 96	6	Thedford.....	2 67	26	1 10	15
Shoal Lake.....	4 68	23	1 30	25	Georgetown.....	2 29	15	0 64	27
Bartons.....	5 24	18	1 29	6	Midland.....	1 71	29	0 32	21
Morden.....	2 69	19	0 90	18	Cowal.....	1 91	26	0 73	15
Pembina Crossing.....	4 50	21	1 18	5	Oliver's Ferry.....	3 34	24	1 05	21
Gretna.....	2 82	22	0 32	20	Aurora.....	1 80	29	0 61	27
Norquay.....	4 71	16	1 01	6	Huntsville.....	1 62	22	0 43	15
Rapid City.....	2 74	25	1 55	6	Watford.....	1 34	26	0 39	26
Rathwell.....	6 74	18	3 14	7	Saushine.....	2 53	26	1 31	21
Beaver Creek.....	4 46	24	2 50	7	Goderich.....	0 53	28	0 30	27
Treherne.....	4 75	22	1 29	18					
Carman.....	2 97	19	1 26	18	<b>NEW BRUNSWICK—</b>				
Cartwright.....	3 72	19	0 66	5	Point Essequima.....	2 82	22	0 84	10
Cartwright (2).....	3 84	23	1 25	6					
Rosebank.....	2 95	26	1 05	17	<b>NOVA SCOTIA—</b>				
Selkirk.....	2 72	12	0 94	18	Port Marion.....	2 63	22	0 62	29
Belmont.....	3 81	19	0 96	18					
Greenwood.....	3 12	35	1 57	6					

## Thunder recorded on :—

1. Swift Current, Medicine Hat, Pincher Creek, Regina, Pense, Moose Jaw, Cannington Manor.
2. Swift Current, Medicine Hat, Pincher Creek, Regina, Calgary, Cannington Manor, Duck Lake.
3. Banff, Battleford, Prince Albert, Medicine Hat, Pincher Creek, Rathwell, Regina, Calgary, Henrietta.
4. Banff, Battleford, Swift Current, Prince Albert, Qu'Appelle, Medicine Hat, Elkhorn, Shoal Lake, Pembina Crossing, Selkirk, Hillview, St. Albans, Brandon, Moose Jaw, Cannington Manor, Henrietta, Duck Lake, Stuart's Lake.
5. Battleford, Minnedosa, Prince Albert, Qu'Appelle, Medicine Hat, Emerson, Toronto, Pilot Mound, Pembina Crossing, Norquay, Rathwell, Treherne, Carman, Hillview, Thompson, St. Albans, Moose Jaw, Cannington Manor, Henrietta, Loch Erroch, Donald.
6. Bermuda, Winnipeg, Minnedosa, Qu'Appelle, Emerson, Pilot Mound, Roseberry, Pembina Crossing, Norquay, Treherne, Carman, Belmont, Hillview, St. Albans, Brandon, Alameda.
7. Port Arthur, Rockliffe, White River, Point Clark, Haileybury, Toronto, Roseberry, Point Clark, Alton, Port Rowan, Point Pelee, Clontarf.
8. Rockliffe, Calgary, Father Point, Coldwater, London, Emerson, Point Clark, Haileybury, Stratford, Thompson, Wilton Grove, Scarboro', Coldstream, Alton, Georgetown, Cowal, Aurora, Regina, Pense, Calgary, Chicoutimi, Point Clark, Brantford, Calvin, Birnam, St. Mary's, Cottam, Port Dover, St. Anns, Bancroft, Uplands, Sprucedale, Haliburton, Georgina, Beatrice, Gravenhurst.
9. Qu'Appelle, Woodstock, Roseberry, Pembina Crossing, Belmont, St. Albans, Moose Jaw, Chicoutimi.
10. Qu'Appelle, Sable Island, Roseberry, Duck Lake.
11. Port Arthur, Regina, Port Dover.
12. Port Stanley, Rockliffe, Ottawa, Woodstock, Point Clark, Durham, Stratford, Toronto, Roseberry, Scarboro', Georgetown, Midland, Regina, Moose Jaw, Parker's Ridge, Point Clark, Brantford, Alton, Bognor, Owen Sound, St. Mary's, Paris, Lucknow, Welland, Clontarf, St. Anns, Burk's Falls, Georgina, Beatrice.
13. Quebec, Pilot Mound, Calgary, Moose Jaw.
14. Battleford, Emerson, Woodstock, Rosebank.

15. Port Stanley, Parry Sound, Swift Current, Medicine Hat, Point Clark, Stratford, Norquay, Carman, Rosebank, Blenheim, Wyoming, Presqu'Isle, Coldstream, Thedford, Georgetown, Cowal, Sunshine, Point Clark, Brantford, Bognor, Owen Sound, Port Rowan, Birnam, St. Mary's, Paris, Point Pelee, Cottam, Bancroft.

16. Halifax, Medicine Hat, Point Clark, Pincher Creek, Norquay, Scarborough, Calgary, Pilot Bay, Georgetown, P.E.I., Point Clark, Alton, St. Anns, Savanne.

17. Father Point, Richmond.

18. Father Point, Roseberry, Regina, Calgary, Georgetown, P.E.I.

19. Port Stanley, Grindstone, Woodstock, Stratford, Wyoming, Coldstream, Alton, Thedford, Cowal, Fort Steele, Pictou, Georgetown, P.E.I., Brantford, Port Rowan, Birnam, St. Mary's, Pelee Island, Port Dover, Welland, St. Anns, Savanne.

20. Port Stanley, Swift Current, Medicine Hat, Alton, Cottam, St. Anns.

21. Port Stanley, Point Clark, Stratford, Toronto, Sunshine, Point Clark, Brantford, Bognor, Paris, St. Anns, Beatrice.

22. Quebec, Father Point, Dalhousie, Griffin Lake, Cottam, Savanne.

23. Charlottetown, Emerson, Sable Island, Haileybury, Bathurst, Truro, Pictou, Turtle Mountain, Pembina Crossing, Rathwell, Regina, Alameda, Kamloops, Stuart's Lake, New Glasgow, Parker's Ridge, Georgetown, P.E.I., Savanne.

24. Spence's Bridge, Banff, Medicine Hat, Point Escuminac, Haileybury, Truro, Norquay, Denbigh, Moose Jaw, Calgary, Alameda, Chilcotin, Fort Steele, Stuart's Lake, Brome, Port Rowan, Georgian.

25. St. Andrews, Parry Sound, Swift Current, Qu'Appelle, Medicine Hat, Dalhousie, Point Escuminac, Toronto, Turtle Mountain, Pembina Crossing, Belmont, Scarboro', Denbigh, Georgetown, Cowal, Aurora, Sutton, Brandon, Moose Jaw, Stony Creek, Alton, Lakefield, Paris, Port Dover, Welland, St. Anns, Calgary, Duck Lake, Chilcotin, New Glasgow, Pictou, Parker's Ridge, Point Escuminac, Beatrice.

26. St. Andrews, Yarmouth, Battleford, Minnedosa, Swift Current, Prince Albert, Qu'Appelle, Point Escuminac, Stratford, Truro, Wyoming, Georgetown, Paris, Calgary, Duck Lake, New Glasgow, Pictou, Georgetown, P.E.I., Cottam.

27. Qu'Appelle, Elkhorn, Point Escuminac, Roseberry, Regina, Brandon, Moose Jaw, French Creek, Griffin Lake, New Glasgow, Channell, Port Rowan.

28. Bermuda, Pincher Creek, Selkirk, Kamloops.

29. Bermuda, Medicine Hat, Ottawa, Point Clark, Wyoming, Thedford, Fort Steele, Point Clark, Calvin, Owen Sound, Birnam, Cottam, Gravenhurst.

30. Bermuda, Medicine Hat, Pincher Creek, Georgetown, Moose Jaw, Alameda, Burk's Falls, Sprucedale.

31. Medicine Hat, Calgary, Pilot Bay.

*Aurora recorded--*

*When the class of aurora is noted by the observer, it is given, (I), being the brightest, (IV), the feeblest in brilliancy.*

1. Haileybury, IV; Truro, IV; Hillview, III; Channel Island, III; Georgetown, P. E. I., Savanne.

2. Minnedosa, II; Georgetown, IV.

5. Haileybury, II; Savanne.

9. Channel Island, IV; Savanne.

10. Georgetown, P.E.I.

11. Sydney, IV; Father Point, III; Channell, III.

12. Sydney, IV; Saugeen, IV; Haileybury, I; Durham, IV; Channell, III; Georgetown, P.E.I.; St. John, II.

13. Pembina Crossing, II; Belmont, Hillview, II; St. Albans, II; Fort Steele, III; Cape Magdalen, Georgetown, P.E.I., Bognor, IV.

14. Alameda, IV.

16. Pembina Crossing, III.

19. Pembina Crossing, IV; Savanne.

20. Pembina Crossing, III; St. Albans, II.

1. Quebec, IV; Father Point, III; St. Albans, III; Gravenhurst.

2. Minnedosa, IV; Emerson, I; Pembina Crossing, III; St. Albans, IV; Fort Steele, IV; Savanne.

23. Father Point, IV; Haileybury, III; Hillyview, IV; Savanne.  
 25. Savanne.  
 26. Swift Current, IV; Haileybury, IV; Pembina Crossing, III; Channel Island, IV; Savanne,  
 Cape Chatte, Calvin, Clontarf.  
 27. Haileybury, III.  
 28. Quebec, III; Father Point, III; Pembina Crossing, IV; Channel Island, IV; Henrietta, II.  
 29. Savanne.  
 30. Pembina Crossing, IV; Savanne.  
 31. Pembina Crossing, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
 THE HORIZON IN THE MONTH OF JULY, 1896.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....	..	S	0.16	0.24	0.48	0.61	0.71	0.75	0.76	0.75	0.76	0.66	0.66	0.56	0.29	.
KUPER ISLAND .....	S	0.05	.39	.62	.75	.76	.77	.77	.71	.71	.67	.73	.72	.62	.35	.
AGASSIZ, D. C. ....	..	..	.26	.45	.59	.63	.65	.70	.68	.67	.69	.63	.51	.40	.22	..
*BATTLEFORD .....	S	.26	.36	.47	.58	.57	.18	.56	.48	.48	.48	.49	.48	.42	.05	..
INDIAN HEAD .....	S	.16	.54	.14	.78	.78	.81	.79	.78	.72	.77	.74	.70	.61	.30	.
BRANDON .....	..	.09	.33	.49	.63	.69	.69	.65	.64	.58	.57	.59	.61	.51	.30	.
WINNIPEG .....	..	.23	.43	.4	.70	.69	.71	.69	.72	.73	.70	.68	.66	.59	.41	.06
WOODSTOCK .....	..	.06	.23	.44	.57	.70	.73	.75	.75	.71	.76	.69	.64	.59	.24	.04
TORONTO .....	..	.15	.45	.56	.63	.76	.78	.78	.74	.68	.65	.62	.49	.38	.14	.
LINDSAY .....	S	.12	.32	.51	.54	.60	.61	.56	.59	.51	.53	.52	.43	.39	.25	.15
BARRIE .....	..	.14	.43	.53	.56	.64	.69	.68	.65	.62	.55	.49	.47	.44	..	..
KINGSTON .....	S	.25	.48	.61	.71	.81	.73	.67	.66	.66	.64	.67	.54	.42	.19	.8
MONTREAL .....	..	.12	.21	.43	.55	.65	.73	.76	.73	.76	.73	.65	.53	.43	.07	..
FREDERICTON .....	S	.15	.36	.47	.58	.69	.69	.70	.71	.73	.77	.71	.69	.61	.35	.7

	ESQUIMAULT.	KUPER ISLAND.	AGASSIZ.	BATTLEFORD.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.47	0.55	0.45	0.39	0.57	0.47	0.54	0.51	0.51	0.44	0.47	0.53	0.56	0.54
MAXIMUM DAILY AMOUNT .....	0.89	0.88	0.81	0.82	0.87	0.84	0.82	0.87	0.87	0.94	0.87	0.87	0.98	0.92
DATE .....	7	14	8	23	30	2	30	18	23	23	1	2	23	29
NO. OF DAYS COMPLETELY CLOUDED.....	0	0	1	1	2	4	2	1	0	1	3	1	2	3

\* Battleford instrument not in position until the 8th.

### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 934. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA .....	86	66	11	9	83.1
LOWER LAKE REGION .....	116	92	19	5	87.5
UPPER ST. LAWRENCE .....	197	82	16	9	81.1
LOWER ST. LAWRENCE .....	101	76	15	10	82.7
GULF .....	110	89	14	7	87.3
MARITIME PROVINCES .....	114	86	21	4	86.0
TOTAL .....	634	494	99	41	85.3

No storm warnings were issued.

# TORONTO OBSERVATORY—MAGNETIC REVIEW FOR JULY, 1895.

Mean westerly declination.....	4° 44'·4
Mean horizontal force.....	0·16654
Mean vertical force.....	0·60276

*Declination.*—The declination magnet was disturbed during the 1st and up to 6<sup>h</sup> of 2nd ; it then quieted down and remained in about normal position until 20<sup>h</sup> of 5th, from which time until 12<sup>h</sup> of the 6th it was again somewhat but not greatly disturbed. A small deflection to the east followed immediately by a sharp deflection of 6'·5 to the west was noted at 3<sup>h</sup> 20<sup>m</sup> of the 11th ; the magnet was then quiet until 21<sup>h</sup> and then slightly disturbed until midnight and again during the forenoon of the 12th. A disturbance began about 17<sup>h</sup> of the 12th and was particularly marked between 19<sup>h</sup> 30<sup>m</sup> and 4<sup>h</sup> of 13th ; at 20<sup>h</sup> the magnet took an easterly swing of 26'·5 in 10 minutes, and between 22<sup>h</sup> 40<sup>m</sup> and 55<sup>m</sup> an easterly swing of 35'. The curve again showed disturbance during the night and early morning hours of the 13th–14th and 14th–15th, the chief departure from normal being 27' east in 35 minutes, beginning at 20<sup>h</sup> 45<sup>m</sup> of the former day and then a more gradual return to normal position. During the early morning hours of the 16th and of the 17th the declination curve was undulatory and characteristically the same on both days. After 20<sup>h</sup> 7<sup>m</sup> of 21st there was an easterly deflection of 11'·4 in 10 minutes, followed by a more gradual return to normal ; then again on the 25th an easterly swing of 15' between 20<sup>h</sup> 5<sup>m</sup> and 30<sup>m</sup>. The magnet was decidedly disturbed on the night of the 26th between 22<sup>h</sup> and 2<sup>h</sup>, and then slightly disturbed until 9<sup>h</sup> of the 30th, after which it was quite steady.

*Horizontal Force.*—The bifilar magnet was slightly disturbed on the 1st and during the afternoon of the 2nd, also from 22<sup>h</sup> of the 5th until 10<sup>h</sup> of the 6th ; after this the magnet was quiet until 15<sup>h</sup> 30<sup>m</sup> of the 11th, from which hour until 3<sup>h</sup> of the 13th it was considerably disturbed, and on the 14th the curve was slightly irregular. After this the magnet showed a normal curve until 9<sup>h</sup> of the 26th, when a moderate disturbance began and lasted until 2<sup>h</sup> of the 27th ; it was also slightly disturbed during the afternoons of the 27th and 28th, and then, with the exception of two sharp hitches between 14<sup>h</sup> 27<sup>m</sup> and 40<sup>m</sup> on the 31st, was quiet until the end of the month.

*Vertical Force.*—The vertical force magnet was slightly disturbed during the night hours of the 1st, then quiet until 22<sup>h</sup> of the 5th, from which hour until 6<sup>h</sup> of the 6th it was disturbed. It was again disturbed from 19<sup>h</sup> 30<sup>m</sup> of the 12th until 3<sup>h</sup> of the 13th and again during the early hours of the 14th. Between 3<sup>h</sup> and 6<sup>h</sup> of the 20th there was a somewhat abnormal increase of force followed by a gradual decrease back to normal. The next disturbance occurred on the 26th, on which day, between 0<sup>h</sup> 20<sup>m</sup> and 1<sup>h</sup> 10<sup>m</sup>, the V. F. decreased 0·0011 C.G.S. and then returned to normal by 1<sup>h</sup> 45<sup>m</sup>.

On the 1st, 2nd, 9th, 10th, 16th, 18th, 20th, 22nd, 25th, 27th, 28th, 30th, the sky was clear, but no aurora was observed ; on all other nights clouds or haze would have hidden any that might have existed.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, December, 1895



## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

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# Monthly Weather Review.

AUGUST, 1895.

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### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SUMMARY OF THE WEATHER.

The chart of mean atmospheric pressure for August shows the pressure to have been below the average throughout the continent, the greatest departure, 0.10 in., stretched from Lake Superior to the Lower St. Lawrence Valley north of the Lower Lake Region, and the next greatest departure, 0.08 in., occurred on the southern coast of California. Temperature in all parts of Canada was also below the average, but as a rule to no large extent.

Eight areas of low pressure were sufficiently well marked to be traced, their mean track was from the Northwestward, north of the Lower Lake Region and over the Lower St. Lawrence Valley and their average rate of travel was 26.7 miles an hour. Two of the depressions developed very rapidly when near to or over the Maritime Provinces and on each occasion caused a gale at many points on our Atlantic and Gulf coasts.

August, as shewn from the mean temperature, was a comparatively cool month in all portions of Canada. In Vancouver Island and over British Columbia the long continued drought was not broken, whereas in Ontario the chief weather characteristic was the large number of thunderstorms experienced, many of which were locally severe. Early frosts did more or less damage in the Northwest Territories and Manitoba, and in Prince Edward Island the month was an exceptionally wet one.

On the 1st a few local showers or thunderstorms occurred along the St. Lawrence Valley and in Manitoba, otherwise the weather was fair in all parts of Canada.

On the 3rd, owing to the presence of a shallow depression, showers and thunderstorms were occasioned at many places in Ontario and Quebec, and on the 4th they spread to the Maritime Provinces.

Between the 3rd and 4th another depression of little energy gave some local showers or thunderstorms from the Rockies to Manitoba. The depression after passing to the southward of Manitoba travelled slowly to the Lake Region and down the St. Lawrence, where its accompanying showers and thunderstorms were more numerous and as a rule heavy, and they were first experienced on the early morning of the 6th. As the winds got into the westward on the 8th in the Gulf of St. Lawrence, they increased for a short time to the force of a moderate gale.

On the 7th, 8th and 9th, rain fell almost continuously in the Northwest Territories and the weather turned quite cool; in Manitoba, however, the rain was neither so continuous nor heavy.

In Ontario there were a few scattered showers or thunderstorms during the night of the 9th, and on the 11th the advent of a shallow depression gave a more general rain. The depression moved slowly down the St. Lawrence to the Gulf, giving showery weather in Quebec until the 13th and in the Maritime Provinces until the 15th, attended by some heavy thunderstorms.

In the Northwest Territories and Manitoba after the 9th, with the exception of a few light scattered showers, the weather was fine until the 13th, when rain fell pretty generally from the Rockies to Manitoba, accompanied in many places by thunderstorms. The depression which occasioned these unsettled conditions afterwards travelled quickly across the continent, rapidly dispersing, and between the 14th and 15th gave a few light local showers in Ontario and Quebec.

Another shallow depression as it traversed the Northwest Territories and Manitoba on the 15th, gave a few local showers, and on the 17th brought numerous showers and thunderstorms in Ontario and Quebec. On the 18th the weather was unsettled and showery in the Maritime Provinces, with very heavy rains on the Bay of Fundy, and at night a little subsidiary depression suddenly developed great energy and caused the winds to increase to gales along the Nova Scotian coast and at the same time rain fell heavily north as far as the Miramichi.

In the Northwest Territories and Manitoba after the 15th higher pressure and fine weather prevailed for some days, and on the night of the 20th frost was experienced in nearly all portions of Manitoba as well as in the North Saskatchewan Valley. Minnedosa recorded 30° and Prince Albert and Winnipeg 32°.

The development of a little depression over the Lake Region on the 20th occasioned thunderstorms in nearly all parts of Ontario and later on throughout Quebec and the Maritime Provinces. Higher pressure and fine weather then ensued from the Lakes to the Atlantic, but it was again interrupted by the advent of another depression, which on the 21st had given some local showers or thunderstorms from the Rockies to Manitoba. During the night of the 22nd and on the 23rd it caused showers and thunderstorms at many places in Ontario, Quebec and the Maritime Provinces. A similar sequence of weather conditions prevailed over these Provinces on the 24th and at night a depression developed very rapidly in the existing trough of low pressure and as it passed over the Maritime Provinces the winds increased to gales over Eastern Nova Scotia and also in the southern portion of the Gulf of St. Lawrence.

The 25th and 26th were fine pleasant days from Ontario to Nova Scotia, so also was the 27th, with the exception of a few showers along the St. Lawrence. On the 28th there were showers and thunderstorms in all portions of Ontario and on the 29th they occurred in the southwestern portion of the Maritime Provinces. The 30th was a fine day but the 31st was showery again, more especially in Quebec.

In the Northwest Territories and Manitoba showers occurred locally on the 22nd, 24th and 25th, and generally in Manitoba on the 26th and 29th. On the night of the 28th there were light local frosts and on the 30th night they were widespread and as a rule severe. Prince Albert recorded 24°, and Qu'Appelle and Minnedosa 28° and 32° respectively.

#### TEMPERATURE.

*The Highest and Lowest Temperature in each Province during August were :*

British Columbia, 99°·0 on 2nd at Griffin Lake ; 25°·7 on 21st at Stuart's Lake.

Northwest Territories, 96°·0 on 12th at Moose Jaw ; 26°·0 on 31st at Prince Albert.

Manitoba, 91°·0 on 15th at St. Albans ; 23°·0 on 31st at Russell.

Ontario, 97°·5 on 10th at Waukegan ; 30°·0 on 28th at Savanah.

Quebec, 84°·0 on 11th at Brome ; 33°·7 on 22nd at Richmond.

New Brunswick, 85°·0 on 7th at Chatham ; 27°·0 on 31st at Bathurst.

Nova Scotia, 84°·3 on 7th at Truro ; 40°·0 on 21st at Truro.

Prince Edward Island, 80°·9 on 7th at Georgetown ; 48°·8 on 30th at Charlottetown.



# PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT ALL STATIONS IN THE DOMINION OF CANADA, AUGUST, 1895.

α. Barometer not reduced to Sea Level. \* Stations not furnished with Registering Thermometers.

STATION.	Latitude N.	Longitude W.	PRESSURE.		TEMPERATURE.			Mean temperature of month.	Mean amount of cloud.	No. of days completely clouded.	DIRECTION OF WIND FROM						VELOCITY OF WIND			PRECIPITATION.		No. of fair days.	No. of Thunder storms.	No. of Foggs.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			Mean reduced.	Highest.	Lowest.	Range.	Date.				Mean daily range.	N.	N. E.	E.	S. E.	S. W.	W.	N. W.	C.	Total number of hours.	Mean miles per hour.				Highest days velocity.	Date and direction from.	Amount.	Difference from average.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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## PRECIPITATION.

The rainfall in British Columbia was much below the normal : at some stations not a drop fell during the whole month. In the North-west Territories and Manitoba, it was under the normal and in the remaining provinces it was above except in the South-west part of Ontario and in part of Cape Breton.

*The Distribution is as follows :—*

In British Columbia, the rainfall was in general 0·98 in.; or about 0·94 in. below the average.

In the North-west Territories, 0·99 in.; about 1·01 in. below the average.

In Manitoba, the rainfall was 1·53 in.; or 1·30 in. below the average.

In Ontario, West and South-west District, it was 2·49 in.; or 0·06 in. below the average. In the North and North-west District it was 3·32 in.; or 1·18 in. above the average. In the Central District it was 2·61 in.; or 0·57 in. above the average; and in the East and North-east District it was 2·84 in.; or 0·74 in. above the average.

In Quebec it was 5·32 in.; or 2·06 in. above the average.

In New Brunswick it was 5·23 in.; or 1·67 in. above the average.

In Nova Scotia it was 4·45 in.; or 0·59 in. above the average.

In Prince Edward Island it was 7·14 in.; or 3·79 in. above the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Port Simpson, 6·76 in.; Rivers Inlet, 6·12 in.

QUEBEC.—Montreal, 6·92 in.; Richmond, 5·79 in.; Brome, 5·89 in.; Quebec, 6·26 in.; Chicoutimi, 7·63 in.; Anticosti, W. P., 8·76 in.; Point des Monts, 6·40 in.; Anticosti, S. W. P., 7·75 in.; Grindstone, 6·03 in.; Gaspé, 5·43 in.

NEW BRUNSWICK.—5·39 in.; Point Lepreaux, 7·17 in.; St. John, 9·30 in.; Parkers Ridge, 6·39 in.

NOVA SCOTIA.—Truro, 5·66 in.; Pictou, 6·78 in.; New Glasgow, 5·73 in.

PRINCE EDWARD ISLAND.—Charlottetown, 6·54 in.; Georgetown, 7·73 in.

NEWFOUNDLAND.—Channell, 6·67 in.

*Rain 1 inch and upwards in 24 hours :—*

4. Point Lepreaux, 1·10 in.; Duck Lake, 1·20 in.; Hillview, 1·08 in.; Turtle Mountain, 1·16 in.; St. John, 1·06 in.; Port Simpson, 1·26.

5. White Head, 1·45 in.; Sable Island, 1·02 in.; Truro, 1·02 in.

6. Presqu'Isle, 1·05.; Cherry Valley, 1·17 in.; Blenheim, 1·14 in.; Thompson, 1·11 in.; Cape Norman, 1·09 in.

7. Grand Manan, 1·12 in.; St. John, 1·13 in.

8. Pictou, 1·40 in.; Russell, 1·05 in.

9. Belmont, 1·54 in.; St. Albans, 1·00 in.; Cape Norman, 1·11 in.

10. Port Francis, 1·00 in.

12. Richmond, 1·20 in.; Chicoutimi, 1·06 in.; De Cewsville, 1·43 in.; Quebec, 1·32 in.; Father Point, 1·00 in.; Biequet, 1·40 in.

13. Chicoutimi, 1·10 in.; Anticosti, W. P., 1·56 in.

14. Anticosti, S. W. P., 1·10 in.

15. Channell, 1·27 in.

17. Lakefield, 1·03 in.; Birnam, 1·02 in.; Thedford, 1·03 in.; Scarborough, 1·17 in.; Kitley, 1·02 in.; White River, 1·12 in.; Montreal, 1·08 in.; Lakefield, 1·03 in.

18. Point Lepreaux, 3·00 in.; Point Escuminac, 1·62 in.; Brome, 1·17 in.; Oliver's Ferry, 1·30 in.; Montague, 1·05 in.; St. Andrews, 2·11 in.; Grand Manan, 1·74 in.; St. John, 3·62 in.; Anticosti, 1·36 in.; Montreal, 1·20 in.

19. Georgetown, P.E.I., 3·70 in.; Pictou, 2·56 in.; New Glasgow 2·50 in.; Charlottetown, 2·49 in.; Halifax, 1·70 in.; Yarmouth, 3·10 in.; Chatham, 1·11 in.; Anticosti, W. P., 2·85 in.; Anticosti, S. W. P., 1·48 in.; Rivers Inlet, 1·83 in.; Truro, 2·40 in.

20. Gaspé, 1·88 in.

21. Denbigh, 1·30 in.; Quebec, 1·10 in.

22. Channell, 1·02 in.

23. Owen Sound, 2·19 in.; Whiteside, 1·55 in.; Bancroft 2·08 in.; Beatrice, 1·52 in.; Renfrew, 1·23 in.; Orillia, 1·82 in.; Bognor, 1·51 in.; Quatsino, 1·00 in.; Oliver's Ferry, 1·10 in.; Kitley, 1·10 in.; Bobcaygeon, 1·00 in.; Midland, 2·07 in.; Grand Manan, 1·02 in.; Rivers Inlet, 2·00 in.; Orillia, 1·52 in.

24. Point Clark, 1.55 in.; Parker's Ridge, 2.30 in.; Point Escuminac, 1.06 in.; Richmond, 1.76 in.; Brome, 1.50 in.; Gravenhurst, 2.16 in.; Collingwood, 1.32 in.; Uplands 1.07 in.; Haliburton; 2.52 in.; Lucknow, 1.00 in.; North Bruce, 1.47 in.; Nottawasaga, 1.15 in.; Presqu'Isle, 1.70 in.; Sparrow Lake, 1.82 in.; Wiarton, 1.47 in.; Orangeville, 1.25 in.; Huntsville, 1.07 in.; St. John, 1.46 in.; Coldwater, 1.56 in.; Montreal, 1.43 in.; Montague, 1.10 in.; Clontarf, 1.34 in.

25. Channell, 1.54 in.; Halifax, 1.00 in.; Chatham 1.20 in.; Grindstone, 1.16 in.; Bathurst, 1.03 in.; Uplands, 1.07 in.

26. Belmont, 1.00 in.; Grindstone, 1.57 in.

27. Chicoutimi, 1.46 in.; Pelee Island, 1.25 in.; Anticosti, 1.32 in.

28. Channell, 1.20 in.; Alton, 1.43 in.; Thedford, 1.02 in.; Point des Monts, 1.80 in.; Anticosti, S. W. P., 1.16 in.; Cape Magdalen, 1.00 in.

29. Sable Island, 1.17 in.

# PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER.

	RAINFALL.						RAINFALL.				
	Amount in inches.	No. of Days '01 or Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.		Amount in inches.	No. of Days '01 or Over.	No. of Fair Days.	Heaviest Fall in Month.	Date.
<b>BRITISH COLUMBIA—</b>						<b>Presqu'Isle.....</b>	4.62	15		1.70	24
Goldstream Lake.....	0.75	3	28	0.54	20	Georgetown.....	2.84	14	16	0.44	11
Beaver Creek.....	0.30	4	26	0.19	19	Penbigh.....	4.37	9	22	1.30	21
Salt Spring Island.....	0.15	1	30	0.15	21	Aurora.....	2.56	13	18	0.57	28
Nicola Lake.....	0.40	3	28	0.19	8	Oliver's Ferry.....	4.04	9	22	1.30	19
Enderby.....	0.11	4	26	0.07	6	Wilton Grove.....	1.80	6	25	0.45	6
Union.....	0.09	1	30	0.09	19	Watford.....	2.83	9	22	0.73	17
Nanaimo.....	0.09	0	31	—	—	Landsdowne.....	1.93	9	22	0.73	20
Langley.....	0.52	3	27	0.32	20	Sparrow Lake.....	2.57	5	26	1.62	24
<b>ASSINIBOIA—</b>						Leon's Head.....	3.40	8	23	0.95	10
Pense.....	1.65	5	26	0.52	8	Sunshine.....	2.64	10	21	0.63	24
Wallace.....	2.19	3	28	0.88	4	Westport.....	2.39	12	19	0.37	6
<b>MANITOBA—</b>						Cherry Valley.....	2.25	7	24	0.41	11
Foxton.....	0.86	5	25	0.26	13	Jermy.....	1.72	5	26	0.55	18
Belmont.....	1.96	6	25	1.54	8-9	Scarborough.....	3.41	9	18	1.17	17
Greenwood.....	0.63	6	25	0.18	9	Blenheim.....	2.51	6	25	1.14	6
Morden.....	2.29	6	24	0.64	8-9	Warton.....	3.93	9	22	1.47	24
Selkirk.....	0.65	5	26	0.18	29	Orangeville.....	2.25	10	21	1.25	24
Rosshank.....	2.39	9	26	0.83	9	Coldstream.....	2.31	12	19	0.48	11
Pilot Mound.....	2.31	6	25	0.63	8-9	Kitley.....	3.98	9	22	1.10	23
Cartwright.....	2.58	9	22	0.81	3-4	Montague.....	3.97	7	24	1.10	24
Norquay.....	1.66	8	19	0.62	9	Parma.....	1.19	9	22	0.25	7
Pembina Crossing.....	2.19	8	23	0.81	8	Bobcaygeon.....	2.96	8	23	1.00	23
Gretna.....	2.05	9	29	0.65	5	Arden.....	3.26	14	17	0.69	23
Carman.....	2.14	7	24	0.95	9	Midland.....	3.55	9	9	2.17	24
Beaver Creek.....	0.70	3	28	0.29	8	Orombae.....	2.64	7	24	0.73	24
Turtle Mountain.....	2.49	6	26	1.76	4	Thompson.....	1.72	3	28	1.11	6
Hartney.....	1.58	6	26	0.59	9	Ennismore.....	2.78	6	25	0.98	12
Rapid City.....	0.80	1	29	0.80	8	Princeton.....	1.49	8	23	0.50	11
Rathwell.....	1.40	8	20	0.25	9	Mount Forest.....	2.44	12	19	0.63	24
<b>ONTARIO—</b>						Deer Park.....	2.64	14	17	0.63	11
Nottawasaga Island.....	2.52	8	23	1.13	24	Dealtown.....	2.17	7	24	0.54	11
Thedford.....	3.84	8	23	1.03	17	Coval.....	2.41	8	23	1.02	11
Wingham.....	3.59	8	23	0.85	6	Huntsville.....	2.41	10	21	1.07	24
Emsdale.....	2.51	12	19	0.45	28	Goderich.....	0.76	4	27	0.50	24
Wooler.....	1.73	8	23	1.10	12	<b>NEW BRUNSWICK—</b>					
Robin's Mills.....	1.99	9	22	0.51	6	Point Escuminac.....	3.72	10	21	1.62	19
						<b>NOVA SCOTIA—</b>					
						Port Marion.....	3.98	12	19	1.10	25

Thunder recorded on :—

1. Brandon, Treherne, Portage la Prairie, Hillview, Alameda, St. Albans, Belmont, Pembina Crossing.

2. Bermuda, Minnedosa, St. Albans, Bancroft, Norquay, Pembina Crossing.

3. Port Arthur, Swift Current, Coldwater, Lindsay Toronto, Moose Jaw, Wyoming, Aurora, Scarborough, Calvin, Clontarf, Point Clark, Stony Creek, St. Ann's, Gravenhurst, Lucknow, Haliburton, Regina.

4. Halifax, Swift Current, Lindsay, Durham, Hillview, Alameda, Cartwright, Turtle Mountain, Presque Isle, Georgetown, Scarborough, Sutton, Arden, Parry Sound, Mellendean, Stouffville, Georgina, Alton, Peterborough, Lucknow, Virgil, Lakefield.

5. Parry Sound, Mellendean.

6. Port Stanley, Saugeen, Rockliffe, Banff, Stratford, Deseronto, London, Durham, Montreal, Toronto, Agassiz, Mellendean, Moose Jaw, Thedford, Wyoming, Presqu'Isle, Georgetown, Westport, Scarborough, Wiarton, Coldstream, Kitley, Bobcaygeon, Arden, Thompson, Princeton, Calvin,

Owen Sound, Point Clark, Stony Creek, Burk's Falls, Alton, Port Rowan, Brantford, Birnam, Pelee Island, Port Dover, Lucknow, Lakefield, Sprucedale, Uplands, Beatrice.

7. Port Stanley, Banff, Medicine Hat, Lindsay, Montreal, Bancroft, Pilot Bay, Calgary, Moose Jaw, Denbigh, Blenheim, Coldstream, Clontarf, Gravenhurst, Bognor, Lakefield, North Bay.

8. Sydney, Swift Current, St. Albans, Stratford, Georgetown, P.E.I., Richmond, Mellendean, Treherne, Portage la Prairie, Hillview, Alameda, Cannington-Manor, Oonikup, St. Albans, Belmont, Cartwright, Pembina Crossing, Turtle Mountain, Thedford.

9. Grindstone, Winnipeg, Stratford, Portage la Prairie, Selkirk, Norquay, Bognor, Wiarton, Coldstream, Point Clark, Savanne, St. Mary's, Sault Ste. Marie, Paris.

10. Saugeen, Rockliffe, Haileybury, Lindsay, Durham, Thedford, Midland, Mount Forest, Owen Sound, Point Clark, St. Anns, Georgina, Gravenhurst, Bognor, Peterborough, Port Dover.

11. Port Stanley, White River, Coldwater, Durham, Montreal, Toronto, Bancroft, Wyoming, Georgetown, Aurora, Scarborough, Coldstream, Sutton, Bobcaygeon, Midland, Princeton, Mount Forest, Cowal, Owen Sound, Whiteside, St. Ann's, Stouffville, Mattawa, Georgina, Gravenhurst, Bognor, Port Dover, Lucknow, Regina.

12. Calgary, Lindsay, Ottawa, Durham, Montreal, Fort Steele, Kitley, Bobcaygeon, Arden, Whiteside, Lakefield, Uplands.

13. Father Point, Minnedosa, St. Albans, Emerson, Montreal, Chicoutimi, Portage la Prairie, Hillview, St. Albans, Belmont, Rosebank, Cartwright, Pembina Crossing.

14. Charlottetown, Winnipeg, Truro, Stony Mountain, Pictou, Georgetown, P.E.I., Parker's Ridge, Norquay, Lansdowne.

15. Port Stanley, Deseronto, Scarborough, Coldstream, Stouffville, Alton, Lakefield.

16. Charlottetown, Father Point, Medicine Hat, Georgetown, Treherne, Belmont, Savanne.

17. Quebec, Kingston, Port Stanley, Saugeen, Parry Sound, White River, Toronto, Port Arthur, Stratford, Lindsay, Deseronto, Durham, Montreal, Bancroft, Georgetown, P.E.I., Richmond, Thedford, Wyoming, *terrific*, Presqu'Isle, Georgetown, Aurora, Lansdowne, Sparrow Lake, Sunshine, Westport, Scarborough, Wiarton, Coldstream, Arden, Midland, Thompson, Princeton, Dealtown, Cowal, Georgina, Gravenhurst, St. Mary's, Brome, Bognor, Port Rowan, Peterborough, Calvin, Owen Sound, Point Clark, Stony Creek, St. Ann's, Stouffville, Paris, Port Dover, Lucknow, Virgil, Lakefield, Weiland, Beatrice.

18. Halifax, Yarmouth, St. Andrews, Quebec, Father Point, Saugeen, Rockliffe, Parry Sound, St. John, Stratford, Truro, Ottawa, Durham, Montreal, Dalhousie, Thedford, Sunshine, Wiarton, Coldstream, Parma, Arden, Huntsville, Calvin, Point Clark, St. Ann's, St. Mary's, Brome, Pelee Island, Paris, Lucknow, Birnam, *most severe since 1872*, Uplands, North Bay.

19. Charlottetown, Woodstock, Truro, Dalhousie, Parker's Ridge, Digby, Denbigh, Calvin, Port Rowan.

20. Port Stanley, Saugeen, Rockliffe, Coldwater, Lindsay, Durham, Toronto, Thedford, Wyoming, Emsdale, Georgetown, Wilton Grove, Sparrow Lake, Sunshine, Scarborough, Coldstream, Sutton, Midland, Cowal, *terrific wind and hail*, Stouffville, Burk's Falls, Georgina, Alton, St. Mary's Bognor, Birnam, Calvin, Spence, Point Clark, Peterborough, Lucknow, Welland, Uplands.

21. Bermuda, Charlottetown, Port Stanley, St. John, Truro, Channell, New Glasgow, Pictou, Georgetown, P.E.I., Point Escuminac, Parker's Ridge, Sable Island, Treherne, Belmont, Selkirk, Rosebank, Pembina Crossing, Alton, Port Rowan.

22. Bermuda, Port Arthur, Emerson, Portage la Prairie, Calgary, Alameda, Belmont, Savanne, Regina.

23. Coldwater, Durham, Denbigh, Sunshine, Mount Forest, Calvin, Point Clark, Bognor, Lucknow.

24. Halifax, Rockliffe, Medicine Hat, Haileybury, Deseronto, Mellendean, Calgary, Clontarf, Port Rowan, Port Dover, Haliburton, Uplands.

25. Port Arthur, Swift Current, Stratford, Channell, Mellendean, Alameda, Moose Jaw, Digby, Pembina Crossing.

26. Haileybury, Ottawa, Mellendean, Belmont, Rosebank, Cartwright, Norquay, Gretna.

27. Port Arthur, Port Dover.

28. Port Stanley, Saugeen, Stratford, Deseronto, Durham, Toronto, Channell, Mellendean, Thedford, Wyoming, Georgetown, Aurora, Wilton Grove, Westport, Scarborough, Princeton, Cowal, Point Clark, Alton, Sarnia, Birnam, Lucknow.

29. Port Stanley, Mellendean, Westport, Coldstream, Port Rowan, Pelee Island.

31. Owen Sound.



*Aurora recorded—*

Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (II') the feeblest in brilliancy.

1. Portage la Prairie, Hillview IV.
3. Chicoutimi.
6. Channel Island, IV.
7. Savanne.
8. Burk's Falls.
9. Charlottetown, IV; Sydney, IV; Yarmouth, III; Quebec, II; Kingston, III; Rockliffe, IV; Minnedosa, I; Medicine Hat, III; St. Albans, I; Winnipeg, III; Coldwater, IV; Haileybury I; Elkhorn, III; Montreal, Point Escuminac, II; Sable Island, Richmond, IV; Channel Island, I; Treherne, II; Moose Jaw, Pembina Crossing, II; Glacier, *very bright*, Peterborough III.
10. Father Point, IV; Winnipeg, III; Haileybury, IV; Emerson, II; Montreal, Chicoutimi, Moose Jaw, Savanne, Sprucedale, I.
11. Yarmouth, IV; Father Point, III; White River, III; St. Albans, III; Channel Island, IV; Hillview, IV; Duck Lake, II; Cannington-Manor, Pembina Crossing, IV; Thedford, IV.
12. White River, III; Bird Rocks, II; Savanne.
13. Quebec, III; Rockliffe, IV; White River, IV; Cape Chatte, Elkhorn, IV; Channel Island, Hillview, IV; Moose Jaw, Gravenhurst, IV.
14. Father Point, III; White River, III; Elkhorn, IV; Durham, Channel Island, IV; Hillview, IV; Cannington Manor, Savanne.
15. White River, III; Haileybury, IV; Sable Island, Savanne.
16. Moose Jaw, Pembina Crossing, III.
17. Cape Norman, III; Haileybury, IV; Channel Island, III; Treherne, III; Moose Jaw Cannington-Manor, Pembina Crossing, II; Savanne.
18. Father Point, IV; Cape Norman, III; Haileybury, III; Hillview, IV; Cannington-Manor, Pembina Crossing, III; Savanne.
19. Treherne, IV; Hillview IV.
20. Minnedosa, IV; Cape Chatte, Portage la Prairie, Pembina Crossing, IV; Savanne, Gravenhurst, IV.
21. Cape Norman, II; Pembina Crossing, IV.
22. Hillview, IV; Henrietta.
23. Hillview, IV; Pembina Crossing, IV.
24. Coldwater, II; Hillview, IV.
25. Father Point, III; Minnedosa, IV; Savanne, Georgetown, IV.
26. Winnipeg, IV.
28. Hillview, IV.
29. Quebec, IV; Father Point, IV; Cape Chatte, Moose Jaw.
31. Thedford, IV.

*Frost recorded on :—*

13. Edmonton, Hazlemere, Barkerville, Quesnelle, Chilcotin, Midway.
14. Mission Valley.
15. Hillview, Donald.
16. Donald.
19. Savanne.
20. St. Albans, *vegetables badly damaged*, Emerson, Elkhorn, Bobcaygeon, Ennismore, Princeton, Lucknow, Oakbank, Morden, Selkirk, Rosebank, Pilot Mound, Norquay, Pembina Crossing, Hillview, Turtle Mountain, Cannington-Manor, Oonikup, Minnedosa.
21. Woodstock, Wooler, Oliver's Ferry, Lansdowne, Westport, Midland, Georgina, Savanne, Roseberry, Barkerville, Stuart's Lake.
22. Woodstock, Toronto, Georgetown, Montague, Arden, Beatrice, Alton, Bancroft.
23. Woodstock.
27. Pincher Creek, Moose Jaw, Regina, Fort Steele, Banff.
28. Savanne, Pilot Mound.
29. Hillview, *ice*.

30. Turtle Mountain, Roseberry, Chaplin, Duck Lake, Edmonton.  
 31. Emerson, Elkhorn, Hillview, *icc*, Coldstream, Oakbank, Belmont, Rosebank, Cannington-  
 Manor, Moose Jaw, Indian Head, Regina, Qu'Appelle, Pilot Mound, Norquay, *icc*, Pembina Cross-  
 ing, Prince Albert, Alameda, St. Albans, Brandon, Russell, Bathurst.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
 THE HORIZON IN THE MONTH OF AUGUST, 1895.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON.	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....		00	00	027	044	058	067	073	073	074	079	073	065	036	001	..
KUPER ISLAND .....			16	46	65	71	77	65	76	75	77	71	49	28	06	..
AGASSIZ, B. C. ....			04	24	43	53	58	62	61	60	60	57	43	36	14	..
BATTLEFORD .....	S	031	58	68	70	57	60	60	61	65	61	61	58	34	8	..
INDIAN HEAD .....		24	61	73	81	77	73	74	73	74	72	58	41	11	..	..
BRANDON .....		8	41	63	68	71	72	72	80	85	80	75	73	64	23	..
WINNIPEG .....		18	51	70	73	76	79	82	85	77	77	76	73	61	17	8
WOODSTOCK .....		06	28	50	62	69	72	80	83	77	70	65	53	41	14	..
TORONTO .....		07	53	64	61	75	64	66	72	70	67	59	53	41	09	..
LINDSAY .....		12	27	44	59	70	68	63	62	62	60	55	31	18	22	63
BARRIE .....		06	44	59	63	70	64	66	61	64	66	55	43	32	03	..
KINGSTON .....		17	52	63	62	74	76	76	69	68	68	64	63	55	13	..
MONTREAL .....		02	24	47	51	61	65	66	70	74	69	68	57	40	5	..
FREDERICTON .....		16	38	55	58	62	67	69	73	71	62	45	38	32	04	..
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)		047	052	040	052	055	069	064	054	054	046	049	058	058	050	
MAXIMUM DAILY AMOUNT .....		080	084	090	086	083	087	088	088	090	099	085	092	099	091	
DATE .....		24	5	26	14	17	17	27	13	25	16	13	16	16	17	
NO. OF DAYS COMPLETELY CLOUDED .....		3	3	6	1	5	2	0	0	0	1	2	1	2	3	

### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 622. These were divided as follows:—

DISTRICT.	No. ISSUED.	VERIFIED.			Percentage.
		No. Fully.	No. Partly.	No. Not.	
MANITOBA .....	92	79	10	3	91.3
LOWER LAKE REGION .....	108	92	13	3	91.2
UPPER ST. LAWRENCE .....	100	83	11	6	83.5
LOWER ST. LAWRENCE .....	97	75	11	11	83.0
QUEBEC .....	108	87	16	5	88.0
MARITIME PROVINCES .....	117	96	17	4	89.3
TOTAL .....	622	502	78	32	88.6

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from all observing stations are used.

The daily probabilities and storm warnings were issued by Probability Officer B. C. Webber.

## STORM WARNINGS.

During the month warnings on the approach of one storm were issued to our agents, and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 33, all of which were verified. At 5 stations the force exceeded that indicated by the signal displayed, and one station reported a storm when no warning was issued.

In connection with the warnings, predictions as to probable directions of the wind were given and of the 33 warnings verified as to force the whole were fully verified.

No. 1. At 10.30 a.m. on the 31st, at Georgian Bay and Lake Huron stations also Pelee Island and Kingston were warned for a S.W. to N.W. gale and at the same time all stations throughout the St. Lawrence River and Gulf were warned for a moderate S. to W. and N.W. gale. At the time there was a moderate depression over Ontario.

During the day a moderate to fresh gale set in on Lake Huron and the Georgian Bay from the S.W. and N.W. There was also a moderate gale on Lake Ontario and at Pelee Island on Lake Erie the wind reached a velocity of 60 miles from the W. As the depression passed eastward a moderate S. to W. gale set in throughout the St. Lawrence River and Gulf.

### TORONTO OBSERVATORY—MAGNETIC REVIEW FOR AUGUST, 1895.

Mean westerly declination.....	4° 45' 3
Mean horizontal force.....	0.16652
Mean vertical force.....	0.60276

*Declination.*—The magnet during the first day of the month was exceptionally steady with the exception of a slight irregularity between 9<sup>h</sup> and 10<sup>h</sup>, and again just previous to the 24<sup>h</sup> observation, lasting a short time. The following two days were also very steady, the daily curve being well marked. The morning of the 4th was slightly disturbed but the magnet steadied down after 7<sup>h</sup>. At 21<sup>h</sup> of the 4th a slow easterly swing of the needle began and at 21<sup>h</sup> 28<sup>m</sup> the reading was 5' 4 east of the monthly mean. On the morning of the 5th slight movements were going on. From the afternoon of the 5th to the evening of the 9th a quiet period prevailed. At 19<sup>h</sup> 30<sup>m</sup> slight changes set in and became more extended during the early morning hours, at 22<sup>h</sup> 40<sup>m</sup> a sharp easterly swing of 23' brought the magnet to its extreme easterly limit, 28' 5 east of normal. At 22<sup>h</sup> 52<sup>m</sup> a rapid westerly swing set in, after which slow waves of disturbance followed. After 24<sup>h</sup> 10<sup>m</sup> the magnet moved slowly east until at 1<sup>h</sup> 12<sup>m</sup> a westerly sweep of 36' set in, and at 1<sup>h</sup> 45<sup>m</sup> the reading was 9' 5 west of the normal. After 2<sup>h</sup> rapid vibrations began, the magnet moving quickly east until 2<sup>h</sup> 30<sup>m</sup> when the disturbance abated considerably, but slight disturbing action was maintained until the evening. At 21<sup>h</sup> 30<sup>m</sup> of the 10th the magnet took up a short easterly movement followed by small changes, these were succeeded at 0<sup>h</sup> of the 11th by a steady westerly curve lasting until 2<sup>h</sup> 20<sup>m</sup> when the magnet moved slowly east the change amounting to 20' in about fifty minutes of time after which a few smaller changes occurred up to the morning of the 12th. Slight changes were again noticed at 23<sup>h</sup> 30<sup>m</sup> of the 14th and 2<sup>h</sup> 50<sup>m</sup> of the 15th, small westerly swings in both cases being shewn. The following hours of the 15th were quiet with the exception of a slow easterly deviation at 19<sup>h</sup> 5<sup>m</sup>. On the following morning the curve was a little undulatory, and notably so on the 18th and 19th up to 6<sup>h</sup> there was however an absence of any important departure from normal. The 20th was a quiet day with the exception of slight irregularities previous to 6<sup>h</sup>, lasting a short time. During the remainder of the month nothing worthy of note was registered, except a few small changes on the night of the 25th and mornings of the 28th and 29th.

*Horizontal Force.*—The horizontal force was steady up to the afternoon of the 3rd, when it became a little irregular in its movements and also on the next afternoon. On the 6th the curve was somewhat wavy. During the afternoon of the 9th the force gradually increased until 18<sup>h</sup>, when the curve became decidedly wavy and after 24<sup>h</sup> the force again decreased rapidly, the fall being considerably accelerated at 1<sup>h</sup> 10<sup>m</sup> of the 10th, the minimum being reached at 1<sup>h</sup> 53<sup>m</sup>. The total change was .0031 C.G.S., the magnet then gradually recovered its normal position, moving in long swings, one of the most important being a quick increase at 3<sup>h</sup> 15<sup>m</sup>. At 0<sup>h</sup> the magnet had almost come to rest but continued slightly disturbed up to the morning of the 11th. There was again slight disturbance on the afternoon of the 11th and then little change until the end of the month, except that on the 18th and 19th the curves were slightly wavy.

*Vertical Force.*—The principal disturbance of the vertical component occurred on the 9th and 10th. The force diminished rapidly between 22<sup>h</sup> of the 9th and 1<sup>h</sup> 45<sup>m</sup> of the 10th, a recovery then began and at 3<sup>h</sup> 15<sup>m</sup> a sharp increase brought it nearly back to normal and at 6<sup>h</sup> the magnet was steady. From this hour until 14<sup>h</sup> a gradual increase of force was registered, after which it decreased slowly up to 22<sup>h</sup> and then more rapidly. The force increased again between 0<sup>h</sup> and 1<sup>h</sup> 45<sup>m</sup> of the 11th and then slowly regained its normal value. Slight indications of disturbing action were noticed on the night of the 11th and also on the early morning of the 19th, but beyond this nothing of importance was recorded up to the close of the month.

On the 1st, 3rd, 4th, 5th, 7th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 24th, 25th, 26th, 27th, 29th and 30th the sky was clear, but no aurora was observed. On all other nights, clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, January 8th, 1896.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

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# Monthly Weather Review.

SEPTEMBER, 1895.

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### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the courses of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SUMMARY OF THE WEATHER.

The pressure was slightly above the average over the North Pacific States, British Columbia and the extreme southern portion of the continent and below the average nearly everywhere else, the greatest departure 0.10 inches occurring over Wisconsin and Lake Superior. Temperature was a little above the average over Ontario and a portion of Quebec and below average, as a rule to a very small extent, in all other portions of Canada. Nine areas of low pressure were charted they all moved from the West and North west and passed either over or to the northward of the Lake Region and their average rate of travel was 30 miles an hour.

1st—7th.—During the first week of the month the weather was fine from the Lakes to the Atlantic, the only interruptions being heavy rains or thunderstorms in Southern Ontario on the 5th and some scattered showers or thunderstorms on the 7th, almost entirely confined to Ontario. Temperature was high, daily maxima were generally near to or above 80° in the shade, and the winds were for the most part light or moderate.

In the North-west Territories and Manitoba during this interval the weather was disturbed and showers and often heavy rains and thunderstorms were daily experienced in nearly all districts. Temperature which for the first few days was high, especially in Manitoba, then became much lower and frost was pretty widely recorded on the 6th and 7th.

8th—14th.—On the 8th and 9th there were a few scattered showers or thunderstorms in Ontario. On the 9th they were also experienced in Quebec. On the 11th showers and thunderstorms were pretty general from the Lakes to the Atlantic; again on the 12th they were numerous but nearly everywhere light. At other times the weather on the whole was very fine. Temperature was not excessive and no severe winds occurred although they frequently attained the force of fresh or strong breezes.

In the North-west Territories and Manitoba the disturbed conditions of the preceding week were perhaps a little improved, but rain in smaller or larger quantities, at times widespread and at others more locally confined occurred frequently. Temperature for the greater part was low and on the 8th and 12th heavy and general frosts were recorded.

15th—21st.—On the 17th and early part of the 18th showers and thunderstorms prevailed in nearly all portions of the Lower Lake Region and over the Southern portion especially they were heavy nearly everywhere and in some places exceptionally severe. At Sarnia one of the wildest thunderstorms experienced for many years occurred, many barns were burnt by lightning and torrents of rain fell, followed at seven o'clock on the morning of the 18th by a remarkable recession of the waters of Lake Huron to the extent of three feet, then to a rise in a few minutes of a foot above the usual level, this phenomenon happened no less than three times in succession. On the 17th and 21st

there were light showers in the Maritime Provinces, on the 19th local showers and thunderstorms in Ontario and on the 15th light showers pretty well distributed over all the provinces. Temperature was about normal until the 19th but on the 20th and 21st a remarkable burst of heat occurred over Ontario and maxima of over 90° in the shade were recorded in nearly all localities.

On the 17th and 18th the winds reached the force of a moderate gale from the south and west at some places in the Gulf of St. Lawrence and likewise on the 20th in the Lake Region.

In the North-west Territories and Manitoba from the 15th to the 18th inclusive the weather was fine and quite warm, but on the 19th, the advent of an important disturbance occasioned the winds to increase to a gale with rain and in Alberta the first fall of snow of the season was recorded. The 20th was a finer day in Manitoba, but in the Territories it was still very unsettled with rain in some localities and snow in others. The 21st was generally fair and chilly.

22nd—30th.—The early autumn gales were pretty well experienced from the Lakes to the Atlantic during the last ten days of the month. They occurred in all Districts between the 25th and 26th, and the 27th and 29th and on the 22nd and 23rd in the Lake Region and the Gulf of St. Lawrence. There were showers and thunderstorms in all the provinces on the 26th also between the 29th and 30th but at other times the weather on the whole was fine. The great heat of the last two days of the preceding week in Ontario was unabated on the 22nd and it had now spread throughout Quebec and the Maritime Provinces. On the 23rd however in Ontario and on the 24th elsewhere, the temperature became much more moderate, the nights were often quite cool and on the 28th a heavy frost was experienced over the Georgian Bay district and the Ottawa Valley.

In the North-west Territories and Manitoba showers, generally light, occurred in many places between the 22nd and 23rd, attended by strong winds and gales. Again on the 27th, there were some local rains and on the 30th a few scattered showers. For the most part, however, the weather was fine and cool, especially from the 26th until the 29th, inclusive. Frosts were almost of nightly occurrence.

British Columbia.—On Vancouver Island the rainfall for the month was light, several light frosts occurred and on the 19th there was fresh snow on the mountain tops, also on the 19th a thunderstorm was experienced at Victoria, attended by heavy hail. On the mainland, in some portions the rainfall was heavy and again in others only light. Frost was generally recorded between the 19th and 21st. Snowfalls occurred at various places in the upper mainland. Nicola Lake reported stormy weather from the 17th until the end of the month.

## TEMPERATURE.

*The Highest and Lowest Temperature in each Province during September were :*

British Columbia,	94°·0 on 18th at Spence's Bridge,	12°·0 on 26th at Griffin Lake.
North-west Territories,	93°·0 on 2nd at Cannington Manor,	13°·5 on 21st at Banff.
Manitoba,	97°·0 on 2nd at St. Albans,	14°·0 on 30th at Oakbank.
Ontario,	99°·0 on 22nd at Cottam,	17°·0 on 28th at Sprucedale.
Quebec,	89°·6 on 24th at Chicoutimi,	25°·1 on 29th at Father Point.
New Brunswick,	87°·0 on 23rd at Parker's Ridge,	30°·0 on 18th at Parker's Ridge.
Nova Scotia,	87°·4 on 23rd at Truro,	29°·0 on 29th at Truro and New Glasgow.
P. E. Island,	84°·8 on 23rd at Georgetown,	37°·0 on 29th at Georgetown.









## PRECIPITATION.

The rainfall in September was above the average in the North-west Territories, Manitoba, Prince Edward Island and also in the western parts of Ontario, in all the other provinces it was below the average the largest defect occurring in New Brunswick.

*The general distribution is as follows :—*

In British Columbia, the rainfall was in general 3·29 in.; or about 0·50 in. below the average.

In the North-west Territories, 1·41 in.; about 0·26 in. above the average.

In Manitoba, the rainfall was 1·10 in.; or 0·03 in. above the average.

In Ontario, West and South-west District, it was 3·11 in.; or 0·29 in. above the average. In the North and North-west District it was 2·33 in.; or 1·36 in. below the average. In the Central District it was 2·88 in.; or 0·22 in. below the average; and in the East and North-east District it was 2·39 in.; or 0·54 in. above the average.

In Quebec it was 2·02 in.; or 1·31 in. below the average.

In New Brunswick it was 1·50 in.; or 1·59 in. below the average.

In Nova Scotia it was 2·23 in.; or 0·93 in. below the average.

In Prince Edward Island it was 3·78 in.; or 0·63 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Agassiz, 6·67 in.; Abbotsford, 6·91 in.; Port Simpson, 9·48 in.; Hazlemere, 5·23 in.; Loch Erroch, 9·26 in.; Rivers Inlet 10·72 in.; Langley, 5·41 in.; Chilliwack, 6·43 in.

NEWFOUNDLAND.—Channell, 5·15 in.

BERMUDA.—Prospect, 9·28 in.

*Rain 1 inch and upwards in 24 hours :—*

1. Grindstone, 1·05 in.
4. Coldstream, 1·48 in.; Blenheim, 1·23 in.; Thompson, 1·04 in.; Dealtown, 1·23 in.; Cowal, 1·40 in.; Watford, 1·24 in.; Cottam, 1·22 in.; Stony Creek, 1·23 in.; Uplands, 1·47 in.
5. Hillview, 1·03 in.; Brandon, 1·16 in.
6. Elkhorn, 1·50 in.; Minnedosa, 1·21 in.
7. Rivers Inlet, 1·50 in.; Port Simpson, 1·36 in.; Wallace, 1·14 in.; Abbotsford, 1·18 in.; Enderby, 1·03 in.; Linden Valley, 1·38 in.
8. River Inlet, 1·02 in.; Chilliwack, 1·13 in.; Loch Erroch, 1·00 in.
10. Heron Bay, 1·00 in.; St. Johns, 1·28 in.
11. Montreal, 1·69 in.; Mellendean, 1·02 in.; Oliver's Ferry, 1·48 in.; Kitley, 2·76 in.; Clontarf, 2·23 in.
12. Pelee Island, 1·00 in.
15. Bermuda, 1·04 in.
17. Wyoming, 1·60 in.; Cowal, 1·00 in.; Bermuda, 1·50 in.
18. Sunshine, 1·24 in.; Watford, 1·15 in.; Port Rowan, 1·05 in.; Point Clark, 1·24 in.; Sarnia, 1·08 in.; Port Stanley 1·08 in.
19. Donald, 1·33 in.; Heron Bay, 1·10 in.
21. Hazlemere, 1·52 in.
22. Rivers Inlet, 1·13 in.; Port Simpson, 1·07 in.; Quatsino, 1·83 in.; Hazlemere, 1·22 in.; Quesnelle, 1·35 in.; Loch Erroch, 1·41 in.; Abbotsford, 1·20 in.; Heron Bay, 1·10 in.; Port Arthur, 1·45 in.
23. Rivers Inlet, 1·35 in.; Bella Coola, 1·20 in.; Chilliwack, 1·44 in.; Quatsino, 1·70 in.; Agassiz, 1·17 in.; Loch Erroch, 2·36 in.; Langley, 1·40 in.; Savanne, 1·10 in.
24. Rivers Inlet, 1·22 in.
25. Quatsino, 1·15 in.; Aurora, 1·18 in.; Ennismore, 1·00 in.; Watford, 1·18 in.; Point Clark, 1·03 in.; Peterborough, 1·25 in.
26. London, 1·03 in.; Woodstock, 1·42 in.; Scarborough, 1·18 in.; Otonabee, 1·17 in.; Wooler, 1·24 in.; Coldstream, 1·27 in.; Croydon 1·00 in.; Jermyn, 1·29 in.; Orangeville, 1·52 in.; Wilton Grove, 1·37 in.; Sunshine, 1·04 in.; Princeton 1·09 in.; St. Ann's, 1·59 in.; Stouffville, 1·12 in.; Thorold, 1·39 in.; De Cewsville, 1·19 in.; Paris, 1·26 in.; St. Marys 1·05 in.; Lakefield, 1·24 in.; Brantford, 1·30 in.; Waterford, 1·65 in.; St. George, 1·33 in.; Stony Creek, 1·36 in.; Alton, 1·90 in.
27. Mellendean, 1·02 in.; Georgetown, 1·04 in.
28. Bermuda, 2·40 in.
29. Thompson, 1·73 in.
- Halifax 1·51 in.; Bromie, 1·00 in.; Channell, 2·50 in.; Port Morien, 1·10 in.; Sable Island, 1·55 in.; Georgetown, 1·09 in.; Coldstream, 1·10 in.; Sydney, 2·13 in.

# PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER.

	RAINFALL.					SNOWFALL.	
	Amount in inches.	No. of Days of or Over	No. of Fair Days.	Heaviest Fall in Month.	Date.	Amount in inches.	Number of Days.
<b>BRITISH COLUMBIA—</b>							
Enderby .....	3.48	12	18	1.03	7	..	..
Nicola Lake .....	1.16	8	20	..	..	..	..
Victoria .....	1.08	9	21	0.27	.....	..	..
Goldstream Lake .....	2.48	10	20	0.61	8-23	..	..
Beaver Creek .....	2.41	14	14	0.69	12	..	..
Nasomio .....	1.30	10	10	0.51	22	..	..
Salt Spring Island .....	1.09	7	23	0.25	17	..	..
Langley .....	5.41	18	9	1.40	23	..	..
Union .....	2.56	17	13	0.41	28	..	..
Quamichan .....	1.10	12	18	0.40	12	..	..
<b>NORTH-WEST TERRITORIES—</b>							
Pease .....	1.66	2	28	0.53	11-27	..	..
Wallace .....	3.34	4	26	1.14	7	..	..
<b>MANITOBA—</b>							
Turtle Mountain .....	1.28	9	20	0.53	6	..	..
Orkney .....	0.93	3	26	0.40	27	..	..
Pembina Crossing .....	0.08	2	27	0.19	27	..	..
Belmont .....	1.21	6	24	0.51	6	..	..
Norquay .....	1.66	6	21	0.48	7	..	1
Morden .....	0.65	2	27	0.43	27	..	..
Greenwood .....	1.05	10	20	0.25	6	..	..
Selkirk .....	0.79	5	24	0.26	6	..	..
Pilot Mound .....	0.58	5	25	0.21	27	..	..
Beaver Creek .....	0.71	2	27	0.65	6	..	..
Hartney .....	1.44	7	27	0.45	27	..	..
Cartwright .....	0.94	8	20	0.32	27	..	1
Foxton .....	0.89	6	24	0.27	6	..	..
Ratbwell .....	0.96	5	18	0.37	6	..	..
<b>ONTARIO—</b>							
Arlan .....	1.79	10	19	0.54	25	..	..
Aurora .....	2.85	9	21	1.18	25	..	1
Warton .....	1.90	7	23	0.50	17	..	..
Scarborough .....	3.46	7	21	1.18	26	..	..
Georgetown .....	2.06	12	15	0.69	26	..	..
Ursa .....	2.59	11	19	0.54	25	..	1
Otonabee .....	2.99	5	25	1.17	26	..	..
Landowne .....	1.72	5	25	0.67	30	..	..
Denbigh .....	1.59	4	25	0.73	29	..	1
Midland .....	2.61	9	21	0.65	17	..	1
Presque Isle .....	1.37	7	23	0.52	18	..	..
Mount Forest .....	2.53	10	20	0.85	26	..	1
Oliver's Ferry .....	3.11	4	26	1.45	11	..	..
Theftford .....	2.70	12	18	0.85	25	..	..
Boboygeon .....	1.64	7	23	0.67	26	..	..
Wooler .....	2.73	7	23	1.29	26	..	..
Wyoming .....	4.18	8	22	1.60	17	..	..
Sparrow Lake .....	1.70	10	20	0.40	18	..	..
Parma .....	1.68	8	22	0.81	26	..	..
Cherry Valley .....	1.96	8	22	0.58	25	..	..
Westport .....	1.90	8	22	0.65	26	..	..
Kitley .....	4.57	7	23	2.76	11	..	..
Robin's Mills .....	1.88	7	23	0.83	26	..	..
Coldstream .....	4.88	9	21	1.48	4	..	1
Croydon .....	2.62	4	26	1.90	26	..	..
Deer Park .....	5.83	7	23	0.90	26	..	..
Blenheim .....	2.96	7	22	1.23	4	..	..
Emsdale .....	2.03	11	19	0.50	11	..	1
Linden Valley .....	3.02	7	23	1.28	7	..	..
Thompson .....	5.71	8	22	1.73	29	..	..
Jermyn .....	3.26	7	23	1.29	26	..	..
Ennismore .....	3.13	6	24	1.00	25	..	..
Montague .....	2.76	7	23	0.78	29	..	..
Dealtown .....	2.26	4	26	1.23	4	..	..
Cowal .....	4.18	8	22	1.40	4	..	..
Lion's Head .....	2.80	8	22	0.70	17	..	..
Orangeville .....	3.85	6	24	1.52	26	..	..
Huntsville .....	1.45	7	23	0.80	11	..	1
Wilton Grove .....	3.52	6	24	1.35	26	..	..
Sunshine .....	3.44	6	24	1.24	18	..	..
Watford .....	4.20	8	23	1.53	4	..	..
Princeton .....	2.79	7	23	1.09	26	..	..
Nottawasaga Island .....	2.70	4	26	1.00	25	..	..
<b>NEW BRUNSWICK—</b>							
Point Escominas .....	1.47	5	25	0.92	21	..	..
<b>NOVA SCOTIA—</b>							
Port Morien .....	2.27	5	7	1.10	30	..	..

Thunder recorded on:—

1. Georgetown, P.E.I.
2. Haileybury, Regina, Treherne, Portage la Prairie, St. Albans, Pembina Crossing, Belmont, Turtle Mountain, Duck Lake, Cannington Manor, Moose Jaw, Kamloops, Winnipeg, Qu'Appelle, Banff.
3. Oonikup, Uplands.

4. Haileybury, Loch Erroch, Agassiz, Burk's Falls, Port Stanley, Port Arthur, Rockliffe, White River, Princeton, Wilton Grove, Cowal, Thompson, Coldstream, Wyoming, Scarborough.

5. Haileybury.

6. Coldwater, Emerson, Ottawa, Rathwell, Pembina Crossing, Calgary, Sparrow Lake.

7. Deseronto, Lindsay, Calvin, Uplands, Peterborough, Alton, Rockliffe, Toronto, Brantford, Lakefield, Welland, Stouffville, Clontarf, Princeton, Linden Valley, Cherry Valley, Bobcaygeon, Georgetown, Barrie.

8. Pilot Bay, Brome, Haliburton, Parma.

9. Point Clark, Port Stanley, Stony Creek, Lucknow, Sparrow Lake.

10. Haileybury, Lindsay, Ottawa, Agassiz, Burk's Falls, Missanabie, Uplands, Gravenhurst, Calvin, Georgina, Sprucedale, Bognor, Peterborough, Rockliffe, White River, Parry Sound, Birnam, Lucknow, Lakefield, Owen Sound, Mattawa, Thompson, Emsdale, Coldstream, Kitley, Wyoming, Thedford, Denbigh, Arden.

11. Haileybury, Deseronto, Lindsay, Richmond, Burk's Falls, Gravenhurst, Calvin, Georgina, Sprucedale, Haliburton, Spence, Peterborough, Rockliffe, Kingston, Yarmouth, Parry Sound, Bancroft, Point Pelee, Lucknow, Chatham, Stouffville, Huntsville, Emsdale, Sutton, Westport, Bobcaygeon, Ursa, Scarborough, Arden, Barrie.

12. Durham, Deseronto, Alameda, Sarnia, Bognor, Point Clark, Alton, Port Stanley, Kingston, Toronto, Point Pelee, Birnam, Welland, Owen Sound, Cowal, Montague, Sparrow Lake, Wyoming, Thedford, Mount Forest, Denbigh, Lansdowne, Georgetown, Scarborough, Aurora.

13. Russell, Moose Jaw, Blenheim.

14. Emerson, Brandon, Treherne, Rathwell, Pembina Crossing, Turtle Mountain, Cannington-Manor, Oonikup.

15. Sarnia, Port Arthur, Birnam, Thedford, Wiarton.

16. Pembina Crossing, Russell, Port Stanley, Point Pelee.

17. Treherne, Portage la Prairie, Selkirk, Pembina Crossing, Oonikup, Sarnia, Georgina, Bognor, Peterborough, Winnipeg, Qu'Appelle, Brantford, Wilton Grove, Lions Head, Coldstream, Wyoming, Molland, Georgetown, Wiarton.

18. Stratford, Coldwater, Durham, Lindsay, London, Woodstock, Georgina, Point Clark, Alton, Saugeen, Parry Sound, Toronto, Birnam, Brantford, Lucknow, Welland, Port Rowan, Owen Sound, Stouffville, St. Ann's, Princeton, Huntsville, Thompson, Linden Valley, Blenheim, Bobcaygeon, Thedford, Mount Forest, Presque'Isle, Scarborough, Barrie.

19. Brandon, Portage la Prairie, Rathwell, Pembina Crossing, Turtle Mountain, Russell Cannington-Manor, Loch Erroch, Pilot Bay, Chilliwack, Victoria, Quamichan, Calvin, Sable Island, Sarnia, Gravenhurst, Bognor, Point Clark, Port Stanley, Birnam, St. Mary's, Mattawa, Cowal, Kitley, Wyoming, Thedford.

20. Rockliffe, White River, Minnedosa, Bancroft, Clontarf, Thompson.

21. St. Andrews, Bancroft.

22. Father Point.

23. Father Point, White River.

24. Port Simpson, Emerson, Brandon, Rosebank, Treherne, St. Albans, Belmont, Cannington-Manor.

25. Coldwater, Peterborough, Point Clark, Toronto, Birnam, Owen Sound, Cowal, Sutton, Thedford, Presque'Isle, Wiarton, Aurora.

26. Uplands, Alton, Port Stanley, Saugeen, Kingston, Grand Manan, St. Andrews, Haileybury, Stratford, Durham, Truro, Deseronto, Lindsay, London, St. John, Bognor, Georgetown, P.E.I., Whitehead, Digby, Pictou, Burk's Falls, Georgina, Whiteside, Yarmouth, Bancroft, Waterford, Brantford, Lakefield, Welland, Port Rowan, St. Ann's, Princeton, Lions Head, Linden Valley, Kitley, Westport, Mount Forest, Lansdowne, Georgetown, Scarborough.

27. Charlottetown.

29. Sunshine.

Sable Island, Whitehead.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (II) the feeblest in brilliancy.*

2. Kamloops, Quebec, IV.
3. Treherne, III; Pembina Crossing, IV.
4. Hillview, II; Treherne, II; St. Albans, III; Qu'Appelle, Savanne.
5. Haileybury, IV; Burk's Falls, I.
6. Alameda, IV.
10. Hillview, IV.
12. Alameda, III; Moose Jaw, Savanne.
13. Truro, IV; Channel Island, Alameda, IV; Channell, IV; Owen Sound, II; Savanne.
14. Haileybury, II; Truro, IV; Halifax, IV; Montreal, Cape Norman, III; Richmond, I; Pembina Crossing, II; Hillview, III; Rosebank, IV; Treherne, II; Portage la Prairie, St. Albans, II; Pilot Mound, Russell, Calgary, III; Moose Jaw, Cannington Manor, Duck Lake, II; Quebec, II; Winnipeg, IV; Minnedosa, II; Qu'Appelle, III; Calgary, I; Medicine Hat, II; Prince Albert, I; Gravenhurst, IV; Calvin, Sprucedale, I; Point Clark, II.
15. Truro, IV; Emerson, IV; Ottawa, Chicoutimi, IV; Channel Island, Hillview, II; Brandon, Rosebank, IV; Treherne, III; Portage la Prairie, St. Albans, II; Belmont, Russell, Alameda, IV; Moose Jaw, Cannington Manor, Duck Lake, II; White River, III; Minnedosa, I; Qu'Appelle, III; Prince Albert, II; Grinestone, III; Bird Rock, IV.
16. Elkhorn, III; Haileybury, Emerson, Montreal, Chicoutimi, IV; Channel Island, Belmont, Hillview, II; Treherne, III; Portage la Prairie, St. Albans, II; Pilot Mound, Pembina Crossing, II; Duck Lake, IV; Port Arthur, II; Winnipeg, IV; Clontarf, Lucknow, III; Bancroft, Burk's Falls, III; Gravenhurst, III; Beatrice, IV; Calvin, Sprucedale, I; Haliburton, IV; Spence, I; Barrie, III.
17. Elkhorn, III; Emerson, Chicoutimi, IV; Channel Island, Hillview, IV; Treherne, III; Pilot Mound, Pembina Crossing, III; Point Escuminac, Port Arthur, II; Quebec, IV; Winnipeg, IV; Minnedosa, II.
18. Haileybury, IV; Truro, IV; Cape Norman, III; Hillview, II; Treherne, I; Portage la Prairie, St. Albans, II; Pilot Mound, Pembina Crossing, III; Belmont, Russell, Calgary, III; Chaplin, III; Duck Lake, III; Quebec, III; Minnedosa, I; Swift Current, III; Qu'Appelle, III; Prince Albert, I; Savanne, Barrie, IV.
19. Elkhorn, II; Port Simpson, Truro, IV; Esquimalt, Cape Norman, II; Port Arthur, III; Charlottetown, IV; Winnipeg, IV; Gravenhurst, IV.
20. Elkhorn, IV; White River, III.
21. Elkhorn, IV.
22. Haileybury, IV; Hillview, IV; Pembina Crossing, III; Russell.
23. Elkhorn, III; Haileybury, III; Chicoutimi, Portage la Prairie, III; Moose Jaw, Minnedosa, IV.
24. Cape Chatte, Cape Norman, II; Hillview, IV; Treherne, III; Cartwright, Pembina Crossing, IV; Moose Jaw, Minnedosa, IV.
25. Cape Norman, II; Hillview, IV; Pembina Crossing, IV.
26. Treherne, III; Russell, Duck Lake, IV; Kingston, I.
27. Russell, Battleford, III.
28. Chicoutimi, Pembina Crossing, IV; Battleford, III.
29. Channel Island, Hillview, I, *magnificent*, Brandon, St. Albans, II; Pembina Crossing, II; Belmont, Russell, Alameda, IV; Chaplin, IV; Moose Jaw, Cannington Manor, Fort Steele, Channell, III; Port Arthur, I; Minnedosa, I; Prince Albert, II; Bird Rock, II; Toronto, Savanne, Barrie, III.
30. Channel Island, Portage la Prairie, Alameda, IV; Duck Lake, II; Winnipeg, IV; Battleford, IV; Prince Albert, I; Savanne.

*Frost recorded, when not noted by observer the entry of 32° or below has been taken as evidence of frost.*

1. White River (27°), Ursa.
2. Ursa.
4. Banff, *snow*.
5. Oakbank, Brandon, Duck Lake, Pincher Creek, *snow*, Duck Lake (24°), Midway (22°), Nicola Lake, Calgary, *snow*.

6. Fort Macleod, *snow*, Cartwright, Pilot Mound, Donald (24°), Qu'Appelle, *snow*, Georgina.
7. Mellendean, Indian Head, Chaplin, Calgary (240°), Battleford, *snow*.
8. Oakbank, Belmont, Selkirk, St. Albans, Portage la Prairie, Rosebank, Hillview, Indian Head, Moose Jaw, Cannington Manor (18°), Midway (21°) Keremeos, Barkerville, *snow*.
9. Midway (21°), Barkerville, *snow*, Langley, Barclay, Savanne.
10. Pincher Creek (23°), Mission Valley (22°), Princeton (22°), Vernon (29°), Fort Steele, Georgina.
12. Rosebank.
13. Owen Sound, Emsdale, Missanabie.
14. Richmond, Brome, Mattawa, Wiarton, Georgetown, Ursa, Otonabee, Midland, Sarnia, *ice*, Sutton, Croydon, Emsdale, Calvin, Heron Bay, Savanne, Burk's Falls.
15. Chicoutimi, Richmond, Brome, Cannington Manor, Enderby, Millbrooke, Clontarf, De Cewsville, Paris, Welland, Waterford, Bancroft, Arden, *ice*, Wiarton, Georgetown, Otonabee, Lansdowne. Bobcaygeon, *ice*, Kitley, Linden Valley, Jernyn, Peterborough, *ice*, Uplands, Birnam, Georgina.
16. Cannington Manor, Renfrew, Collingwood.
17. Mellendean.
18. Richmond, Brome, Oakbank, Cannington Manor, Parker's Ridge, *ice*, Renfrew.
19. Gaspé, Hazlemere, Donald, *snow*, Victoria, Calgary 9 in *snow*.
20. Pincher Creek, *snow* 1 foot on level, Donald, (20°), Loch Erroch, Langley, Ennismore.
21. Mellendean, Chaplin (24°), Calgary (23°), Chilliwack, Griffin Lake, (15°), Mission Valley (20°), Quamichan (25°), Kamloops, *ice*, Barkerville, *snow*, French Creek, Canobie, (29°).
22. Cartwright *sleet squalls*, Moose Jaw (19°), Calgary (23°), Cannington Manor (20°), Moose Jaw (20°), Griffin Lake (19°).
23. Belmont, Pilot Mound (16°), St. Albans (20°), Rosebank (20°), Brandon (19°), Hillview (18°), Indian Head (26°), Griffin Lake (15°), Ursa.
24. Alameda (21°), Midway (22°), Stouffville, Lucknow, Birnam Bancroft, Ursa, Alton, Barclay, Sarnia.
25. Fort Steele, Cottam, Bancroft, Coldstream.
26. Griffin Lake (12°), Fort Steele, Brantford.
27. Haileybury, *snow*, Barkerville, *snow*, White River, *snow*, Mattawa, Owen Sound, Arden, Ursa, Oliver's Ferry, Orillia, Georgina, Sarnia.
28. Woodstock, *snow*, Brome, Pembina Crossing, Treherne, Pilot Mound, *snow*, Alameda (16°) Griffin Lake (14°) Fort Steele, White River, *snow*, Parry Sound, Clontarf, Port Dover, St. Mary's Georgina, Calvin, Gravenhurst, Sudbury, Sarnia, Cartier, Burk's Falls, Welland, Port Dover, Lucknow, Birnam, Wanstead, Stony Creek, Georgetown, Midland, *ice*, Linden Valley, Cowal, Alton, Uplands, Haliburton.
29. Norquay, *snow*, Selkirk, *killing garden stuff*, Rathwell, Hillview (21°), Indian Head (19°), Duck Lake (23), Moose Jaw (24°) Calgary (24°), Oonikup (25°), Duck Lake (23°), Fort Steele, New Glasgow, White River, *snow*, Owen Sound, Cowal, Orillia, Birnam, *ice*, Savanne, Cartier.
30. Durham, *snow*, Rosebank, Brandon (21°), Port Rowan, *sleet*, Welland, Waterford, *sleet*, Aurora, *snow*, Ursa, *snow*, Denbigh, *snow*, Midland, *snow*, Croydon, Emsdale, *snow*, Jermyn, Peterborough, Alton, *snow*, Orillia, Biscotasing, 4 in. *snow*, Savanne, Fort Francis, Sarnia, Cartier.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE  
THE HORIZON IN THE MONTH OF SEPTEMBER, 1905.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....	..	0.05	0.33	0.48	0.54	0.58	0.51	0.49	0.43	0.41	0.40	0.34	0.12			
KUPER ISLAND .....		0.0	16	44	59	69	62	41	41	36	30	28	06			
AGASSIZ, B. C. ....		0.0	09	25	32	33	37	33	31	35	27	10				
BATTLEFORD .....	09	32	41	50	54	60	55	52	54	52	42	25	7			
INDIAN HEAD .....		8	26	46	61	70	59	58	62	68	46	24	8			
BRANDON .....		07	41	45	45	52	52	55	51	50	52	53	26	01		
WINNIPEG .....		50	59	61	62	59	53	51	60	56	59	41	15			
WOODSTOCK .....		12	41	58	64	65	68	70	72	69	62	45	11			
TORONTO .....		22	60	67	70	72	65	65	65	62	65	57	25			
LINDSAY .....	8	29	43	58	65	67	70	70	72	56	40	36	30	07		
BARRIE .....		15	52	58	56	61	64	60	59	61	52	46	24			
KINGSTON .....	8	16	52	63	64	68	67	65	64	64	59	47	19			
MONTREAL .....	01	19	47	60	63	73	77	77	68	68	68	36	8			
FREDERICTON .....	03	36	54	56	69	73	70	72	71	71	69	55	25			
		ESQUIMAULT.	KUPER ISLAND.	AGASSIZ.	BATTLEFORD.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.	
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.57	0.33	0.22	0.41	0.59	0.41	0.46	0.51	0.56	0.51	0.48	0.52	0.63	0.58		
MAXIMUM DAILY AMOUNT .....	0.87	0.82	0.75	0.90	0.81	0.90	0.85	0.86	0.89	0.98	0.90	0.96	0.96	0.91		
DATE .....	20	20	27	28	30	29	30	1	22	21	21	25	29	28		
NO. OF DAYS COMPLETELY CLOUDED.....	8	5	13	3	5	30	2	0	1	3	3	1	3	4		

### STORM WARNINGS.

During the month warnings on the approach of five storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 220, of which 197 were verified. At 14 stations, however, the force exceeded, and at 17 did not reach that indicated by the signals displayed. Three stations reported warnings received late, owing to delay in issue, and 2 owing to delay in transmission.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 197 warnings verified as to force 194, or 98.5 per cent were fully verified, and 107 or 100 per cent were fully and partially verified.

No. 1.—At noon on the 19th, all Lake stations were warned for a moderate gale from the S.E. to S. and S.W., in advance of a depression then over the North-west States. This moved to the Upper Lakes, dispersing to the north of Lake Superior on the 20th. At Sault Ste. Marie, it was reported to have caused a heavy S.W. gale, and at most stations on Lake Huron and the Georgian Bay a moderate to fresh S.E. to S.W. gale occurred, but all stations on Lakes Erie and Ontario reported no storm.

No. 2.—At 10 p.m. on the 21st. Lake Superior stations were warned for a moderate S.W. to W. and N.W. gale, and at 10 a.m. next morning, all the other lakes were warned for a moderate gale from the same directions. This was in advance of a depression which was moving northeastward from Colorado. At 10 p.m. on the 22nd, the storm was central over Lake Superior and increasing in energy. Signals were then changed to No. 4, for a strong gale from the S.W. to W. and N.W. During the 22nd a southwesterly gale set in on the Lakes, which on the 23rd increased to a strong or heavy gale, the wind shifting to W. and N.W.

In advance of the same depression, all River and Gulf of St. Lawrence stations, from Father Point to the Bay Chaleur, were warned at 10 p.m. on the 22nd, for a moderate S. to W. gale.

Father Point reported W. 56 miles per hour during the night of the 23rd. There was also a moderate S.W. to N.W. gale in the northern portion of the Gulf. The storm moved northeastward and passed over Labrador during the night of the 23rd.

No. 3.—At 10 p.m. on the 24th, Georgian Bay and lakes Superior and Huron stations were warned for a moderate S. to W. and N.W. gale in advance of a depression then central over Lake Winnipeg, which, as it passed eastward, caused a moderate gale on Lake Huron and the Georgian Bay, but no storm was reported on Lake Superior. For the same depression the Gulf of St. Lawrence stations were warned at 4 p.m. on the 25th for a moderate westerly gale, and at 10 p.m. all eastern stations were warned for a strong gale from S. to W. A moderate gale prevailed throughout these districts from the S. and W. during the 26th. The depression moved eastward across the country, passing over the Gulf of St. Lawrence on the 27th.

No. 4.—All Lake stations were warned at 10 p.m. on the 25th for a strong S.W. to W. and N.W. gale, in consequence of a depression which then covered the Lakes. These signals were changed next morning on lakes Erie and Ontario to No. 2, for a more moderate gale. During the 26th a gale set in throughout the Lake district, which increased to a strong or heavy gale from the S.W. and W. on lakes Superior, Huron, Erie and the Georgian Bay. The storm dispersed over northern Quebec on the 27th.

No. 5.—Lake Superior stations were warned at 10 p.m. on the 27th, for a moderate gale from S. to W. and N.W., in advance of a depression then over Dakota. Next morning it was central over Wisconsin and had developed considerably; signals were therefore changed to No. 4 for a heavy gale from N.E. to N. and N.W., and all signals were ordered up on the Georgian Bay and Lake Huron for a strong southerly, and on lakes Erie and Ontario for a strong westerly gale. A strong gale set in from the N.E. on Lake Superior which soon increased to a heavy gale, shifting to N. and N.W. and continuing until the night of the 29th. It was reported as a gale of terrific force at Sault Ste. Marie, where it sprung up with little warning almost from a perfect calm.

Throughout the other Lakes there was a fresh to heavy gale, the wind generally veering through S. to W. and N.W.

At 10 a.m. on the 29th, all eastern stations were also warned for a strong easterly gale for the same depression, which was moving eastward and at the time was central over the Georgian Bay. It reached eastern Canada on the morning of the 30th, when an easterly shifting to S. and W. gale set in. It was a heavy gale on the Cape Breton coast but more moderate elsewhere. The depression passed over Labrador on the 1st October.

### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 623. These were divided as follows :—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	91	47	21	22	63.7
LOWER LAKE REGION .....	114	85	15	14	81.1
UPPER ST. LAWRENCE .....	105	84	8	13	83.8
LOWER ST. LAWRENCE .....	103	80	8	15	81.5
GULF .....	101	84	10	7	88.1
MARITIME PROVINCES .....	109	88	13	8	86.7
TOTAL .....	623	468	76	79	81.2

The percentage of verification is obtained by taking the sum of those fully verified and half the sum of those partly verified and dividing by the whole number.

In ascertaining the percentage of verification of the predictions, the reports from all observing stations in Canada are used.

No warnings were issued.



## TORONTO OBSERVATORY—MAGNETIC REVIEW FOR SEPTEMBER, 1895.

Mean westerly declination.....	4° 45' 3
Mean horizontal force.....	0° 16641
Mean vertical force.....	0 60276

*Declination.*—Slight changes were noticed on the 1st during the morning and night hours. The 2nd was entirely free from disturbance, as was also the 3rd up to 10<sup>h</sup>, when a small disturbance began. Between 21<sup>h</sup> 10<sup>m</sup> and 21<sup>h</sup> 50<sup>m</sup> the needle moved slowly east, then a westerly movement set in and by 24<sup>h</sup> it was fairly steady again. At 1<sup>h</sup> 15<sup>m</sup> of the 4th a marked westerly change began and at 1<sup>h</sup> 52<sup>m</sup> the magnet was 17'·1 west of the monthly mean. An easterly movement then set in and at 3<sup>h</sup> 3<sup>m</sup> an easterly extreme of 38'·1 was reached. From 3<sup>h</sup> 3<sup>m</sup> to 5<sup>h</sup> 30<sup>m</sup> sharp deflections were registered, but departures from normal were not very large. After an easterly swing at 5<sup>h</sup> 30<sup>m</sup> the magnet steadied down considerably but not entirely and at 22<sup>h</sup> 30<sup>m</sup> the movements again became more important, the magnet trending west, and a marked westerly extreme was registered at 23<sup>h</sup> 1<sup>m</sup> the magnet then moved east at first by a sharp swing and then a more gradual one lasting up to 0<sup>h</sup> 20<sup>m</sup> of the 5th. Slow waves of disturbance then followed, the needle moving west until 3<sup>h</sup> 30<sup>m</sup> of the 5th, it then moved slowly east until 4<sup>h</sup> 55<sup>m</sup> when a few small hitches ensued. After 6<sup>h</sup> the curve again became somewhat wavy but by 10<sup>h</sup> the disturbance had passed off. The curve continued normal until the morning of the 6th, when some slight changes were noticed, followed again by a quiet magnet which prevailed up to the night of the 9th, when slight changes began, and continued off and on to the morning of the 12th. The 13th was a quiet day. The 14th was slightly disturbed with the exception of the afternoon hours, which were quiet. The movements after 22<sup>h</sup> showed a tendency to increase. At 0<sup>h</sup> 10<sup>m</sup> of the 15th a marked westerly movement began and the extreme of 19'·1 was recorded at 0<sup>h</sup> 40<sup>m</sup>, the magnet then slowly trended east until 1<sup>h</sup> 55<sup>m</sup> and was followed at first by a slow westerly change which became more abrupt at 2<sup>h</sup> 10<sup>m</sup>, culminating in a well marked easterly extreme at 2<sup>h</sup> 35<sup>m</sup>, when a return easterly movement set in. At 3<sup>h</sup> 10<sup>m</sup> the magnet again moved slowly west until 4<sup>h</sup> 30<sup>m</sup> and then gradually regained its normal reading, slight disturbance still continued, however, and at 20<sup>h</sup> 58<sup>m</sup> it became more pronounced, the magnet first moving sharply east and then minor hitches following. At 21<sup>h</sup> 32<sup>m</sup> there was a westerly swing amounting to 10' and another at 22<sup>h</sup> 40<sup>m</sup>, this being of a more prolonged character. Slight disturbance was noticed on the 16th between 15<sup>h</sup> and 18<sup>h</sup>, then the movements became more marked, and between 18<sup>h</sup> and 20<sup>h</sup> 20<sup>m</sup> the curve was decidedly irregular, but there were no large departures from the normal. At 1<sup>h</sup> 4<sup>m</sup> of the 22nd the needle moved slowly west until 2<sup>h</sup> 20<sup>m</sup> and then returned gradually to its normal position and continued fairly steady until 16<sup>h</sup> 10<sup>m</sup> when a sharp easterly swing set in, followed immediately by a gradual westerly movement lasting up to 18<sup>h</sup>, the curve was also irregular for the following two hours. On the 23rd at 4<sup>h</sup> 7<sup>m</sup> the magnet again took up a westerly movement but of smaller amplitude than on the previous morning.

The next change worthy of note was a sharp easterly deflection of 10' which set in at 22<sup>h</sup> 50<sup>m</sup> of the 23rd. This was followed by a gradual westerly movement and at 23<sup>h</sup> 40<sup>m</sup> the magnet was steady. From the 24th to the night of the 29th minor disturbances were noted, and on this night an important storm began. At 21<sup>h</sup> 40<sup>m</sup> the magnet was suddenly deflected to the west, followed by rapid oscillations lasting five minutes. At 21<sup>h</sup> 48<sup>m</sup> a westerly swing of 20' began, reaching its maximum at 22<sup>h</sup> 17<sup>m</sup>, it then turned east and at 23<sup>h</sup> the easterly extreme amounting to 41' occurred. After 23<sup>h</sup> vibrations ranging from 3' to 20' began, the general tendency being west up to 2<sup>h</sup> 45<sup>m</sup> of the 30th, and then easterly, the magnet moving in sharp swings up to 4<sup>h</sup> 30<sup>m</sup>. After this hour the magnet moved west to its normal reading. From 6<sup>h</sup> to 12<sup>h</sup> rapid vibrations were registered but the magnet changed but little from its normal position. The afternoon and evening hours of the 30th were quiet, but after 20<sup>h</sup> the magnet again became disturbed and a marked easterly change took place between 20<sup>h</sup> and 21<sup>h</sup> 16<sup>m</sup>. A rapid westerly swing then occurred followed at 22<sup>h</sup> by an easterly one of 16', the disturbance gradually became less active, and by 24<sup>h</sup> the needle was comparatively steady.

*Horizontal Force.*—On the 1st at 15<sup>h</sup> 42<sup>m</sup> there was a small but quick increase of force, but the magnet shortly came to rest again and continued steady up to the afternoon of the 3rd, when there was a steady increase, lasting up to 16<sup>h</sup>. At 19<sup>h</sup> another increase was registered; this appeared like the initial movement to a large disturbance, nothing of importance however immediately followed. Slow changes were recorded from 1<sup>h</sup> to 5<sup>h</sup> of the 4th, the readings being slightly below the normal. After 5<sup>h</sup> the magnet became much steadier up to the afternoon, when a wavy curve was shown. At 17<sup>h</sup> it became much more uniform, but was again irregular during

the night, slow waves of disturbance being maintained up to 6<sup>h</sup> of the 5th. Between 4<sup>h</sup> 10<sup>m</sup> and 30<sup>m</sup> on this morning a steady decrease of force was recorded. On the 9th between 8<sup>h</sup> and 10<sup>h</sup> the force decreased slightly. The next changes of any importance occurred on the night of the 14th and early morning hours of the 15th, when slow movements were registered, the departures from normal being not however large. After 5<sup>h</sup> of the 15th the movements became less marked, but increased again between 14<sup>h</sup> 40<sup>m</sup> and 18<sup>h</sup>, and there was slight disturbance up to 6<sup>h</sup> of the 16th and again between 20<sup>h</sup> and 22<sup>h</sup>.

After 14<sup>h</sup> of the 18th irregularities began again, continuing off and on to the 24th, when a comparatively quiet period set in, lasting up to the 29th. At 20<sup>h</sup> on this day the force decreased until 21<sup>h</sup> 45<sup>m</sup> a few sharp decreasing swings brought the magnet to its minimum reading, at 22<sup>h</sup> 5<sup>m</sup> the change from 22<sup>h</sup> 22<sup>m</sup> being '00106 C. G. S. There was a rapid increasing swing at 23<sup>h</sup> 37<sup>m</sup> of the 30th, amounting to '0014 C. G. S. in a short time. After recovering from this swing the magnet remained at its normal reading for an hour; between 2<sup>h</sup> and 3<sup>h</sup> there was a steady decrease, but by 3<sup>h</sup> 50<sup>m</sup> the reading was again normal, irregularities continued all morning, but by 14<sup>h</sup> they became less marked and the magnet was comparatively steady until 21<sup>h</sup> 8<sup>m</sup>, when a gradual increase of force began, followed at 21<sup>h</sup> 35<sup>m</sup> by a slow decrease, which continued up to 2<sup>h</sup> 12<sup>m</sup>; then a small increasing swing brought the magnet to about its normal reading.

*Vertical Force.*—Shortly after 1<sup>h</sup> of the 4th this component gradually decreased until 2<sup>h</sup>, its minimum being then recorded. All morning the curve was rather wavy, and during the afternoon a steady increase was shown. At 22<sup>h</sup> the movements became more extended and a marked decrease commenced, the minimum reading being recorded at 23<sup>h</sup> 40<sup>m</sup>; a gradual increase then followed, and after 24<sup>h</sup> the curve became undulating, the force remaining slightly below its normal value. Immediately after 4<sup>h</sup> of the 5th the disturbance abated and a quiet period prevailed up to the 14th, when the curve became slightly irregular. The changes of force were more marked on the early morning hours of the 15th, the readings being then slightly below normal. By 6<sup>h</sup> of the 15th the magnet had come to rest. Changes began again on the afternoon and continued until 7<sup>h</sup> of the 16th, then began again between 20<sup>h</sup> and 22<sup>h</sup> and during the night of the 18th. On the night of the 29th and morning of the 30th the magnet was disturbed and was then below its normal reading; the most important changes were a sharp decreasing swing at 0<sup>h</sup> 20<sup>m</sup> of the 30th and a gradual decrease between 2<sup>h</sup> and 3<sup>h</sup> 28<sup>m</sup>; after the latter hour the force gradually increased up to the afternoon, when the curve became steady, but during the closing hours of the month there is a tendency for an unsteady magnet.

Faint auroral light was observed in the north on the 14th at 24<sup>h</sup>. On the 29th auroral arch and faint streamers in north; at 23<sup>h</sup> diffused light and clumps of streamers; at 24<sup>h</sup> auroral arch and streamers still visible. This aurora was generally observed from west to east throughout the Dominion. In many cases the display was magnificent. On the 1st, 2nd, 3rd, 5th, 8th, 9th, 10th, 11th, 16th, 19th, 20th, 21st, 22nd, 23rd, 24th, 26th and 27th the sky was clear, but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Director.*

METEOROLOGICAL OFFICE,  
Toronto, February 8th, 1896.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

OCTOBER, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the course of areas of high, and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### GENERAL SYNOPSIS OF THE WEATHER.

The mean atmospheric pressure of the month compared with the normal pressure shows that on the Pacific Coast it was about normal. From thence to the Rocky Mountains it increased to  $\cdot 050$  above normal. Over the greater portion of Alberta and Assiniboia it was  $\cdot 100$  above, and from that eastward it gradually decreased till on reaching Lake Superior it was  $\cdot 050$  below. This obtained from Lake Superior to the Gulf of St. Lawrence and throughout the southern portions of Ontario and Quebec. And in New Brunswick and Nova Scotia it was about average, or slightly below.

Temperature was average on the Pacific Coast, from  $3^{\circ}$  to  $4^{\circ}$  above average in Alberta, about or a little below in Assiniboia and Manitoba, excepting the extreme southern portion of the latter province, where it was  $5^{\circ}$  below. Throughout Ontario it was from  $4^{\circ}$  to  $7^{\circ}$  below and from Montreal east from  $1^{\circ}$  to  $5^{\circ}$  below.

The paths of ten low pressure areas were tracked, eight of which originated in Canadian Territory, most of them crossing over the greater part of the country. One moved from Colorado to Manitoba and one took a N. E. course off the coast, passing between the Atlantic Coast and Bermuda. Several were important and were the cause of gales on the Lakes and in Eastern Canada. Their average rate of travel was 30.1 miles per hour.

From the 1st to the 5th the weather was fine from the Lakes to the Atlantic, with moderate temperatures. A depression which passed to the north of the Lakes and across Northern Quebec on the 1st and 2nd, caused a moderate to fresh gale from the S.W. and W. over the Lakes and the St. Lawrence districts, which in the northern portion of the Gulf increased to a strong gale.

In the North-west during the same period the weather was fine, with the exception of a few showers in Assiniboia on the 4th, the temperature during the day being generally pleasant. Local night frosts were numerous but slight.

The second week from the 6th to 12th was more unsettled. On the 6th a depression off the Atlantic Coast disturbed the weather in Nova Scotia, giving high winds and local rains. On the 7th, a depression from Manitoba moved over the Lakes, causing showery weather and a moderate gale there. Passing eastward next day it also gave a moderate gale and showers generally. In western Nova Scotia the rain was heavy, 1.20 in. falling at Yarmouth and .96 in. at Halifax. This was succeeded by an extensive anti-cyclone and the weather remained fine for some time.

On the 11th a cyclone from the North-west moved south-east across the Lakes and the weather became showery in Ontario, and next day showers extended to Quebec. The weather remained fine in the Maritime provinces as the cyclone moved to the middle Atlantic Coast.

In the North-west during the same week, the weather at first was mild, but an anticyclone spread over this district on the 2nd, bringing somewhat colder weather. On the 8th a depression set in over Alberta accompanied by higher temperature. This soon passed eastward and milder weather became prevalent everywhere. On the 9th and 10th a few showers fell, being mostly confined to Alberta and Assiniboia. An increase of pressure brought somewhat colder weather on the 11th in Assiniboia and Manitoba, but this was soon succeeded by another depression moving eastward over the district, and mild weather again prevailed until the end of the week.

The week beginning on the 13th commenced with an important cyclone off the middle Atlantic Coast, accompanied by excessive rains and a fresh gale. It passed over the Maritime provinces next day causing rain and a fresh gale throughout Eastern Canada. Higher pressure however covered the Lake and St. Lawrence districts, and the weather remained fine with moderate temperature until the 15th, the weather clearing at night of the 14th in the Maritime provinces. With the exception of a few local showers the weather continued fine everywhere until the 16th, when a depression from the North-west passed over the Lakes, causing a fresh gale and showery weather there. This depression soon extended to Eastern Canada and next day a moderate to fresh gale and rain became general eastward. Then followed finer weather and higher pressure everywhere for a short time, but another cyclone from the North-west moved over the Lakes on the 19th, and a fresh gale occurred there with light local snowfalls. The cyclone passed over Eastern Canada, where it gave a few showers. It became unimportant there giving only fresh to strong winds. During the early part of this week the weather was fine throughout the North-west, a depression on the 15th moved south-east across these districts giving strong W. and S. W. winds.

This was followed by higher pressure, but again on the 17th another depression moved south-east across the district, giving a strong N. W. gale, which was followed on the 18th and 19th by anti cyclonic conditions and fine colder weather.

The beginning of the week commencing on the 20th was with the exception of a few local showers generally fair from the Lakes to the Atlantic with frosty nights until the 22nd. Then a cyclone from the North-west crossed the Lakes, giving a moderate gale and showers. It soon passed eastward causing the same conditions in Eastern Canada.

It was followed by an anti-cyclone and the weather became generally fair everywhere, continuing so until the 25th. Then a cyclone developed over Quebec and a moderate gale set in from the west in the Lakes and Eastern Canada, with showers of rain or snow in Quebec and the Maritime provinces, the depression passing off the Gulf Coast next day.

Fair weather prevailed in the Northwest on the 26th, but a cyclone developed over Manitoba on the 21st bringing high westerly winds and light local snow falls in Manitoba. Higher pressure then set in and the weather became fine and moderately cold throughout. Fine weather continued until the 25th then a cyclone moved south-eastward across the district with high N.W. winds and light local falls of snow in Assiniboia and Manitoba, being followed by higher pressure.

27th to 31st.—A cyclone from north of Lake Superior passed across the Lakes on the 27th, causing a fall of rain with local thunderstorms. Next day it increased in energy and a fresh to strong gale set in and extended throughout Eastern Canada, being accompanied by sleet or rain in the Lakes and rain in Eastern Canada. High pressure succeeded, and with the exception of a few local falls of snow in Ontario, the weather became fair and moderately cold everywhere. These conditions continued throughout Eastern Canada until the end of the month, but a slight depression over the Lakes gave rain there on the night of the 31st.

In Manitoba fine cold weather prevailed with the exception of a fall of snow in eastern portion on the 27th and continued until the end of the month, temperatures falling to zero at night. It was also fine and cold in Alberta and Assiniboia until the 31st, when lower pressure and higher temperature set in.

#### TEMPERATURE.

*The Highest and Lowest Temperature in each Province during October were :*

British Columbia,	83°·0 on 16th at Enderby,	10°·0 on 27th at Princeton.
North-west Territories,	85°·0 on 18th at Macleod,	—3°·9 on 29th at Prince Albert.
Manitoba,	79°·0 on 3rd at Hillview,	—2°·0 on 29th at Russell.
Ontario,	75°·5 on 3rd at Pelee Island,	4°·0 on 25th at Savanée.
Quebec,	77°·0 on 10th at Grosse Ile,	12°·0 on 31st at Brome.
New Brunswick,	70°·0 on 7th at Fredericton,	14°·8 on 22nd at Fredericton.
Nova Scotia,	72°·2 on 3rd at New Glasgow,	18°·3 on 31st at Truro.
P. E. Island,	66°·0 on 19th at Georgetown,	28°·0 on 22th at Georgetown.







## PRECIPITATION.

The rainfall during October was generally much below the average except in part of Nova Scotia.

*The general distribution is as follows :—*

In British Columbia the rainfall was in general 1·18 in. or about 2·82 in. below the average.

In the North-west Territories, 0·71 in., about 0·73 in. below the average.

In Manitoba the rainfall was 0·55 in., or 0·59 below the average.

In Ontario, West and South-west District it was 1·30 in., or 1·51 in. below the average. In the North and North-west District it was 1·27 in., or 2·19 in. below the average. In the Central District it was 1·38 in., or 1·02 in. below the average, and in the East and North-east District it was 1·67 in., or 1·40 in. below the average.

In Quebec it was 2·01 in., or 1·60 below the average.

In New Brunswick it was 2·01 in., or 1·79 in. below the average.

In Nova Scotia it was 4·88 in., or 0·65 in. above the average.

In Prince Edward Island it was 3·16 in., or 1·06 in. below the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Fort Simpson, 11·80 in.; Bella Coola, 13·50 in.; Rivers Inlet, 6·76 in.; Quatsino, 5·96 in.

NOVA SCOTIA.—Halifax 5·63 in.; Sydney, 5·04 in.; Sable Island, 9·64 in.; Sable Island, E. P. 6·48 in.

NEWFOUNDLAND.—St. Johns, 9·02 in.; Channell, 6·08 in.

BERMUDA.—Prospect, 5·57 in.

*Rain 1 inch and upwards in 24 hours :—*

1. Rivers Inlet, 1·92 in.; Bella Coola 2·80 in.; Sable Island, 1·92 in.; Grindstone, 1·03 in.
2. Bella Coola, 2·70 in.; Quatsino, 1·12 in.
3. Port Simpson, 2·28 in.
4. Bella Coola, 3·70 in.
5. Bermuda, 1·34 in.
6. Sable Island E. P., 2·14 in.; Sable Island, 2·12 in.
7. St. Johns, 2·03 in.
8. Yarmouth, 1·18 in.
10. Port Simpson, 2·69 in.; Sable Island, 1·76 in.
11. Cowal, 1·40 in.; Dealtown, 1·37 in.; Wilton Grove, 1·38 in.; Quatsino, 1·79 in.; St. Johns, 1·20 in.
12. Orangeville, 1·02 in.
13. Halifax, 1·27 in.; Dalhousie, 1·08 in.
14. Channell 1·30 in.; Point Escuminac, 1·50 in.; New Glasgow, 1·16 in.; Whitehead, 1·11 in.; Georgetown, P.E.I., 1·25 in.; Chatham, 1·04 in.; St. Johns, 1·10 in.; Sable Island, 1·05 in.
15. St. Johns, 1·73 in.
17. Channell, 1·00 in.; New Glasgow, 1·00 in.
22. Bermuda, 1·04 in.
24. Sable Island, 1·28 in.
25. Bella Coola, 3 in.
27. Wiarton, 1·30 in.; Presqu'Isle, 1·25 in.
28. Truro, 1·10 in.; Channell, 1·08 in.; New Glasgow, 1·05 in.; Pictou, 1·13 in.
29. Whitehead, 1·35 in.; Guysborough, 2·24 in.; Sydney, 1·10 in.
30. Port Simpson, 1·03 in.
31. Rivers Inlet, 1·12 in.

The snowfall came early in the month and in some part of Northern Ontario quite a large amount fell. Sleighing being general in some districts.

*Snowfall 4 in. and upwards during month :—*

MANITOBA.—Oakbank, 7 in.; Rosberry, 7 in.; Rathwell, 5 in.

ONTARIO.—Coldwater, 22 in.; Stratford, 8 in.; Lindsay, 14 in.; Durham, 18 in.; Otonabee, 9 in.; Emsdale, 7 in.; Linden Valley, 13 in.; Coldstream, 4 in.; Sparrow Lake, 11 in.; Huntsville, 6 in.; Midland, 11 in.; Orangeville, 15 in.; Presque' Isle, 23 in.; Sunshine, 9 in.; Jermyn, 6 in.; Wooler, 5 in.;



Ennismore, 9 in.; Mount Forest, 18 in.; Wiarton, 22 in.; White River, 12 in.; North Bruce, 7 in.; Savanne, 12 in.; Otonabee, 9 in.; Lakefield, 4 in.; Peterborough, 7 in.; Thorold, 5 in.; Orillia, 16 in.; Owen Sound, 13 in.; Collingwood, 14 in.; Uplands, 7 in.; Whiteside, 6 in.; Bognor, 12 in.; Spence, 10 in.; Sprucedale, 9 in.; Nottawasaga Island, 12 in.; Burk's Falls, 6 in.; Lucknow, 18 in.; Pelee Island, 4 in.; Welland, 7 in.; Schrieber, 13 in.; Nepigon, 21 in.; Missanabic, 13 in.; Biscotasing, 16 in.

*Snow 1 inch and upwards in 24 h urs:—*

1. Uplands, 1 in.
3. Biscotasing, 1 in.
7. Nottawasaga Island, 2 in.; Missanabic, 3 in.; White River, 1 in.
8. Cowal, 1 in.; Nepigon, 1 in.; White River, 2 in.
9. Thedford, 1 in.; Coldstream, 2 in.
12. Bicquet, 1 in.
13. Bicquet, 1 in.
14. Bicquet, 3 in.
15. Ennismore, 1 in.; Jermyn, 1 in.; Peterborough, 1 in.; Lakefield, 3 in.
16. Biscotasing, 2 in.
17. Biscotasing, 3 in.; Pointe des Monts, 2 in.
18. Channel Island, 2 in.
19. Stratford, 3 in.; Ennismore, 6 in.; Midland, 4 in.; Princeton, 2 in.; Linden Valley, 10 in.; Savanne, 1 in.; Nottawasaga Island, 2 in.; Alton, 3 in.; Nepigon, 6 in.; Orillia, 7 in.; Mellendean, 4 in.; White River, 2 in.
20. Coldwater, 13 in.; Stratford, 3 in.; Lindsay, 11 in.; Durham, 6 in.; Mount Forest, 6 in.; Jermyn, 3 in.; Sunshine, 3 in.; Presqu'Isle, 12 in.; Midland, 6 in.; Sparrow Lake, 5 in.; Sutton, 1 in.; Bobcaygeon, 1 in.; Blenheim, 1 in.; Wooler, 5 in.; Nottawasaga Island, 8 in.; Point Clark, 4 in.; Bognor, 5 in.; Whiteside, 1 in.; Collingwood, 2 in.; Owen Sound, 6 in.; Orillia, 5 in.; Pelee Island, 4 in.
21. Coldwater, 5 in.; Durham, 4 in.; Mount Forest, 3 in.; Presqu'Isle, 2 in.; Orangeville, 11 in.; Sparrow Lake, 5 in.; Savanne, 4 in.; Missanabic, 2 in.; Sudbury, in.; Nepigon, 3 in.; Schrieber, 1 in.; Bognor, 4 in.; Whiteside, 1 in.; Collingwood, 12 in.; Owen Sound, 2 in.; Brome, 1 in.; Point Lepreaux, 3 in.; Cartwright, 1 in.; Rapid City, 1 in.; Grand Manan, 1 in.; White River, 2 in.
22. Missanabic, 1 in.; Schrieber, 3 in.; Bicquet, 1 in.; Russell, 1 in.; Norquay, 1 in.; Channel Island, 3 in.
23. Presqu'Isle, 1 in.; Emsdale, 2 in.; Spence, 2 in.; Burk's Falls, 1 in.
24. Huntsville, 2 in.; Biscotasing, 3 in.; Nepigon, 1 in.; Sprucedale, 2 in.; Uplands, 1 in.
25. Savanne, 1 in.; Bicquet, 3 in.; Pointe des Monts, 13 in.
26. Biscotasing, 2 in.; Schrieber, 1 in.; Uplands, 1 in.; Russell, 1 in.
27. Savanne, 4 in.; Fort Francis, 5 in.; Missanabic, 2 in.; Nepigon, 8 in.; Schrieber, 2 in.; Oak Bank, 4 in.; Rapid City, 1 in.; Hartney, 1 in.; Treherne, 2 in.; Channel Island, 6 in.; White River, 2 in.; Winnipeg, 1 in.
28. Mount Forest, 2 in.; Presqu'Isle, 6 in.; Midland, 1 in.; Huntsville, 4 in.; Emsdale, 4 in.; Fort Francis, 1 in.; Biscotasing, 2 in.; Missanabic, 3 in.; Nepigon, 1 in.; Schrieber, 2 in.; Spence, 6 in.; Bognor, 1 in.; Uplands, 3 in.; Orillia, 2 in.; Clontarf, 1 in.; Oakbank, 2 in.; Norquay, 2 in.; Cartwright, 2 in.; Mellendean, 3 in.; Morden, 3 in.; Treherne, 1 in.; Gretna, 2 in.; Portage la Prairie, 3 in.; Channel Island, 4 in.; White River, 1 in.
29. Durham, 6 in.; Mount Forest, 2 in.; Thedford, 1 in.; Ennismore, 2 in.; Jermyn, 3 in.; Sunshine, 1 in.; Orangeville, 3 in.; Midland, 2 in.; Bobcaygeon, 2 in.; Otonabee, 6 in.; Fort Francis, 1 in.; Alton, 2 in.; Sprucedale, 4 in.; Bognor, 2 in.; Owen Sound, 3 in.; Orillia, 1 in.; St. Ann's, 2 in.; Thorold, 5 in.; Peterborough, 2 in.; Beatrice, 2 in.; Welland, 7 in.; Port Dover, 2 in.; Niagara, 2 in.; Oakbank, 1 in.
30. Jermyn, 2 in.; Sunshine, 2 in.; Presqu'Isle, 2 in.; Coldstream, 1 in.; Linden Valley, 3 in.; Emsdale, 1 in.; North Bruce, 3 in.; Savanne, 2 in.; De Cewsville, 1 in.; Nepigon, 1 in.; Bognor, 1 in.; Whiteside, 3 in.; Uplands, 1 in.; Owen Sound, 2 in.; Beatrice, 3 in.; Hartney, 1 in.
31. North Bruce, 4 in.; Schrieber, 4 in.; Sprucedale, 3 in.; Spence, 2 in.; Burk's Falls, 1 in.; White River, 1 in.

# PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER.

STATIONS	RAINFALL					SNOWFALL			
	Amount in inches.	No. of Days of or Over.	No. of Fair Days.	Heaviest Fall in Month.	Date	Amount in inches.	Number of Days.	Heaviest Fall in Month.	Date
<b>BRITISH COLUMBIA—</b>									
Panmicheil .....	0.30	4	27	0.13	2	..	..	..	..
Langley .....	0.99	5	24	0.32	10	..	..	..	..
Beaver Creek .....	0.74	7	24	0.32	31	..	..	..	..
Valdes Island .....	0.52	6	25	0.20	9	..	..	..	..
Salt Spring Island .....	0.11	3	25	0.07	31	..	..	..	..
Union .....	0.33	3	28	0.20	31	..	..	..	..
Goldstream Lake .....	0.67	7	24	0.37	24	..	..	..	..
Nicola Lake .....	0.19	3	28	0.10	26	..	..	..	..
Nasimino .....	0.56	1	29	0.18	31	..	..	..	..
<b>NORTH-WEST TERRITORIES—</b>									
Pense .....	0.56	2	29	0.35	3	..	..	..	..
<b>MANITOBA—</b>									
Bathwell .....	R	0	24	..	..	5.0	1	5.0	21
Turtle Mountain .....	0.45	2	24	0.30	14	0.7	1	0.7	21
Pilot Mound .....	0.47	1	27	0.47	14	..	0	..	14
Greenwood .....	0.20	1	27	0.15	10	..	0	..	..
Norquay .....	0.17	1	26	0.17	15	3.3	23	2.0	28
Saskirk .....	0.22	1	26	0.27	10	..	23	..	..
Cartwright .....	0.90	4	29	0.56	28	3.0	2	2.6	28
Rapid City .....	R	0	27	R	14	2.2	12	1.2	27
Roseberry .....	..	..	..	..	..	7.0	22	3.0	19
Warney .....	0.26	2	28	0.21	15	2.5	22	1.5	30
Morden .....	0.10	1	25	0.10	26	3.0	3	3.0	27-28
Pembina Crossing .....	0.77	1	25	0.77	14	..	0	..	..
Belmont .....	0.54	5	26	0.29	14	..	0	..	..
Gretna .....	0.25	1	26	0.25	26	2.0	2	2.0	27-28
<b>ONTARIO—</b>									
Warton .....	1.81	4	23	1.20	27	22.0	6	12.0	30-21
Mount Forest .....	1.97	9	16	0.45	27	18.3	7	9.5	30
Georgetown .....	0.89	8	17	0.57	12	1.8	4	0.8	20
Denbigh .....	1.21	3	25	0.55	11	0.5	1	0.5	23
Officer's Ferry .....	0.60	1	27	0.17	16	..	2	1.0	9
Thornton .....	2.05	1	27	0.72	11	..	..	..	..
Emmetsburg .....	1.87	3	25	0.80	16	0.0	3	6.0	19
Westport .....	0.96	10	21	0.31	12	..	..	..	..
Wander .....	1.99	7	24	0.7	28	..	..	..	..
Jernigan .....	1.24	5	24	0.7	28	..	..	..	..
Sunshine .....	2.11	7	20	0.81	28	9.3	4	4.5	30
Presque Isle .....	2.55	7	20	1.25	28	23.0	7	12.0	20
Wyoming .....	0.99	3	28	0.70	11	..	..	..	..
Orangeville .....	1.56	4	23	1.02	12	15.1	4	10.8	21
Montage .....	0.41	4	27	0.20	12	..	..	..	..
Windsor .....	1.72	3	28	0.47	27	..	..	..	..
Cowal .....	1.61	3	25	1.40	11	1.0	..	1.0	8
Millard .....	2.68	11	17	0.65	16	11.0	3	6.0	20
Scarborough .....	1.13	5	20	0.41	12	1.6	1	1.6	20
Lion's Head .....	1.01	7	24	0.37	16	..	..	..	..
Huntsville .....	1.22	4	24	0.38	16	6.0	3	4.0	28
Robin's Mills .....	1.42	8	22	0.51	12	0.7	1	0.7	29
Sparrow Lake .....	1.90	9	19	0.66	12	10.5	2	5.5	21
Leaside .....	0.95	4	26	0.41	31	..	..	..	..
Kitley .....	0.80	4	27	0.25	31	..	..	..	..
Arlan .....	1.91	7	21	0.50	27	..	..	..	..
Parma .....	1.48	8	23	0.30	31	..	..	..	..
Dealdown .....	1.65	6	27	1.57	27	..	..	..	..
Aurora .....	1.37	10	18	0.49	12	0.6	1	0.6	8
Gold-Stream .....	1.39	7	21	0.50	11	3.7	3	2.0	9
Wilton Grove .....	2.03	5	26	1.78	12	..	..	..	..
Princeton .....	0.83	9	23	0.45	11	2.0	..	1.5	19
Uxton .....	2.46	9	21	0.84	21	..	..	..	..
Linden .....	1.98	7	22	0.65	1	13.0	3	10.0	20
Croydon .....	1.51	7	24	0.36	31	..	..	..	..
Emm's Isle .....	1.25	7	21	0.53	27	7.0	3	4.0	28
Cherry Valley .....	1.41	9	21	0.45	31	..	..	..	..
Bolton .....	1.74	4	23	0.82	16	2.5	4	1.5	20
Deer Park .....	0.75	6	23	0.37	12	0.8	2	0.8	30
Thompson .....	1.05	2	25	0.28	28	..	..	..	..
Kern .....	2.20	4	24	0.86	13	9.3	4	6.0	29
Blenheim .....	2.20	4	24	0.86	13	1.0	1	1.0	29
<b>NEW BRUNSWICK—</b>									
Point Escombe .....	2.10	7	23	1.50	14	..	..	..	..
<b>NOVA SCOTIA—</b>									
Port Mores .....	2.02	12	19	0.14	14	..	..	..	..

\* Snow, amount too small for measurement.

Thunder recorded on:

1. Enderby, Kaslo, Griffin Lake, Pilot Bay, Donald, Fort Steele, Pincher Creek.
2. Fort Steele, Pincher Creek.
3. Donald, Bermuda.
4. Esquimaut.
5. Enderby, Kaslo, Griffin Lake, Fort Steele.

9. Calgary.
16. Point Clark.
21. Sable Island.
23. Bermuda.
24. Ennismore.
25. New Glasgow, Georgetown, Enderby, Griffin Lake, Cannington Manor, Grand Manan.
26. Truro.
27. Mount Forest, Georgetown, Presqu'Isle, Wyoming, Cowal, Scarborough, Sarnia, Sparrow Lake, Blenheim, Bognor, Owen Sound, St. Ann's, Brantford, Welland, Birnam, Port Stanley.
28. Halifax, Otonabee, Peterborough, Digby, New Glasgow, Guysboro', Yarmouth, Grand Manan.
29. Channell, Sable Island, Georgetown.

*Aurora recorded—*

*Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (II) the feeblest in brilliancy.*

1. Savanne, Kamloops, IV; Pembina Crossing, IV; Hillview, II; Quebec, IV; Port Arthur, III.
2. Pilot Mound, III.
4. Treherne, III; Quebec, IV; Winnipeg.
5. Savanne, Chicoutimi, IV; Alameda, IV.
6. Chicoutimi, IV; Quebec, IV; Edmonton, 6 in.
8. Winnipeg, Battleford, IV,
9. Hillview, II.
10. Pembina Crossing, IV; Hillview, III; Quebec, IV.
11. Bobcaygeon, II; Hillview, IV; Minnedosa, II; Battleford, IV.
12. Elkhorn, III; Coldwater, II; Stratford, II; Deseronto, IV; London, Lindsay, IV; Durham, II; Truro, IV; Georgetown IV; Thedford, III; Midland, I; Huntville, IV; Ursa, *bright*; Bobcaygeon, III; Scarborough, Gravenhurst, II; Lucknow, II; Brantford, Haliburton, II; Beatrice, III; Burk's Falls, III; Peterborough, II; Stouffville, I; Collingwood, Calvin, Sprucedale, Point Clark, Alton, II; Stony Creek IV; Treherne, III; Portage la Prairie, III; Pembina Crossing, IV; Belmont, Hillview, I; Cottam, Savanne, Kaslo, I; Donald, Channel Island, II; St. Albans, II; Brandon, Russell, Alameda, IV; Calgary, IV; Moose Jaw, Grenfell, Pincher Creek, Kingston, III; Saugeen, IV; Parry Sound, IV; Rockliffe, IV; Port Stanley, II; White River, IV; Winnipeg, Qu'Appelle, IV; Banff, IV; Prince Albert, I, Toronto, III.
13. Esquimalt, III; Kuper Island, Haileybury, II; Deseronto, IV; Durham, III; Birnam, III; Georgetown, IV; Scarborough, Gravenhurst, IV; Lucknow, III; Pelee Island, Welland, Clontarf, III; Owen Sound, I; Bognor, IV; Savanne, Chilliwack, IV; Donald, Fort Steele, II; Channel Island, II; Pembina Crossing, IV; Russell, Calgary, II; Pincher Creek, Port Arthur, II; Port Stanley, III; Edmonton, II; Battleford, IV; Banff, IV; Toronto, III.
14. Elkhorn, III; London, IV; Fredericton, IV; Halifax, IV; Georgetown, IV; Savanne, Huntsville, IV; Gravenhurst, IV; Birnam, IV; Pelee Island, Owen Sound, I; Richmond, I; Chilli-wack, IV; Donald, Kamloops, IV; Pembina Crossing, III; Hillview, III; St. Albans, III; Calgary, III; Montreal, Quebec, II; Grand Manan, IV; Kingston, III.
15. Coldwater, I; Haileybury, IV; Huntsville, IV; Savanne, Chicoutimi, IV; Russell, Chilli-wack, IV; Pembina Crossing, IV; Belmont, Hillview, III; St. Albans, III; Cannington Manor, Quebec, IV; Port Arthur, I; Rockliffe, IV; Winnipeg.
16. Elkhorn, III; Georgetown, IV; Gravenhurst IV; Cottam, Savanne, Kamloops, IV; Pembina Crossing, III; Hillview, III; Calgary, II; Grenfell, Pincher Creek, Winnipeg, Cannington Manor, Prince Albert, I; Minnedosa I.
17. Haileybury, III; Savanne, Port Arthur, III; Minnedosa, III; Qu'Appelle, III; Battleford, IV; Prince Albert, I.
18. Elkhorn, III; Truro, IV; Birnam, III; Chicoutimi, IV; Hillview, IV; Quebec, III.
19. Birnam, III.
20. Pembina Crossing, IV.
21. Georgetown, IV; Chicoutimi, IV; Hillview, IV.
22. Treherne, II; Pembina Crossing, IV; Hillview, II; St. Albans, III; Russell, Alameda, IV; Moose Jaw, Grenfell.
23. Treherne, III; Pembina Crossing, IV; Brandon, Minnedosa, I; Medicine Hat, IV.
24. Savanne.
25. Hillview, IV; Winnipeg.

26. Fort Steele, IV; Rockliffe, IV.  
 27. Edmonton, II.  
 28. Haileybury, III; Chicoutimi, Treherne, III; Moose Jaw, Quebec, IV.  
 29. Chicoutimi, IV; Swift Current, IV.  
 30. Truro, Chicoutimi, I; Quebec, IV.  
 31. Chicoutimi, IV.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF OCTOBER, 1896.

	HOURS ENDING															
	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMALT .....	..	..	03	015	031	046	050	053	058	059	054	049	028	..	..	..
KUPER ISLAND.....	..	..	..	01	20	51	69	71	70	67	59	59	25	..	..	..
AGASSIZ, B. C. ....	..	..	..	09	44	55	58	67	72	76	72	65	15	..	..	..
BATTLEFORD.....	..	..	01	40	64	69	65	77	82	74	69	29	8	..	..	..
INDIAN HEAD.....	..	..	..	21	53	61	64	59	66	62	54	43	17	..	..	..
BRANDON.....	..	..	..	12	34	48	61	58	62	68	65	55	29	..	..	..
WINNIPEG.....	..	..	03	31	45	48	50	46	51	50	46	41	12	..	..	..
WOODSTOCK.....	..	..	..	15	54	66	70	67	64	55	52	43	17	01	..	..
TORONTO.....	..	..	06	40	55	58	62	61	53	56	51	48	34	03	..	..
LINDSAY.....	..	..	02	12	35	52	54	59	58	48	34	19	17	12	..	..
BARRIE.....	..	..	02	21	41	51	53	50	50	43	37	45	30	08	..	..
KINGSTON.....	..	..	04	36	42	53	58	62	66	64	61	55	36	04	..	..
MONTREAL.....	..	..	00	15	34	49	51	50	52	59	52	24	00	..	..	..
FREDERICTON.....	..	..	00	32	51	55	60	61	54	48	48	52	32	8	..	..

	ESQUIMALT.	KUPER ISLAND.	AGASSIZ.	BATTLEFORD.	INDIAN HEAD.	BRANDON.	WINNIPEG.	WOODSTOCK.	TORONTO.	LINDSAY.	BARRIE.	KINGSTON.	MONTREAL.	FREDERICTON.
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.42	0.45	0.49	0.54	0.47	0.45	0.39	0.46	0.48	0.36	0.39	0.49	0.43	0.45
MAXIMUM DAILY AMOUNT.....	0.94	0.78	0.85	0.88	0.84	0.82	0.85	0.87	0.96	0.92	0.91	0.91	0.99	0.94
DATE .....	5	15	29	8	14	19	1	4	14	13	14	3	20	26
NO. OF DAYS COMPLETELY CLOUDED.....	9	8	4	1	6	1	6	2	5	8	4	4	3	5

### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 707. These were divided as follows :—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	102	76	11	15	79.9
LOWER LAKE REGION .....	123	100	15	8	87.4
UPPER ST. LAWRENCE .....	121	100	14	7	88.4
LOWER ST. LAWRENCE .....	116	90	21	5	86.6
GULF.....	120	94	21	8	84.6
MARITIME PROVINCES .....	125	102	17	6	88.4
TOTAL .....	707	559	99	49	86.1

1. Order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

## STORM WARNINGS.

During the month warnings on the approach of eleven storms were issued to our agents and cautionary signals displayed at the various signal stations. The total number of warnings issued was 352, of which 324 were verified. At 46 stations, however, the force exceeded, and at 9 did not reach that indicated by the signals. Sixteen warnings late owing to delay. One station reported a heavy gale for which no warning was issued.

In connection with the warnings, predictions as to the probable directions of the wind were given, and of the 324 warnings verified as to force, 295 or 91.4 per cent were fully and 324 or 100 per cent were fully and partly verified as to direction.

1. At 10.20 p.m. on the 4th in advance of a disturbance moving up the Atlantic Coast, Scotia and Breton were warned for a heavy easterly gale. The disturbance afterwards skirted the Cape Breton Coast and although its influence was seemingly not felt as far west as Halifax, elsewhere over the districts notified it occasioned a heavy gale. Signals were lowered at 10.40 a.m. on the 7th.

2. At 10 p.m. on the 6th, Lakes Superior, Huron and the Georgian Bay were warned for a heavy and Lakes Erie and Ontario for a moderate westerly gale as a depression was developing and approaching from the North-west. The gale was experienced in all localities between the evening of the 7th and the morning of the 8th and in some places was very severe. The Steam Barge "Africa" foundered with all hands twelve miles south-west of Isle of Coves, and the schooner "Aberdeen" parted her tow line and went ashore off Point Iroquois. The Steam Barge "Dominion" was also driven ashore. Signals were lowered at 10.20 a.m. on the 8th.

3. Lake Superior was warned for a moderate S.W. to N.W. gale at 10 p.m. on the 9th but fresh to strong winds only were experienced. Signals were lowered at 10.30 a.m. on the 11th.

4. At 10.05 p.m. on the 12th Gulf and Ocean stations were warned for a moderate easterly gale in advance of a depression moving up the Atlantic Coast. Next morning at 10.20 a.m. the cautionary were changed to storm signals as the depression had assumed more important proportions. Its accompanying gale was severely felt throughout Eastern Canada during the night of the 13th and on the 14th. Ingonish reports six American vessels put into harbour for shelter. Signals were lowered during the 14th.

5. All Lake stations were warned at 10.35 a.m. on the 15th for a heavy S.W. to N.W. gale as a disturbance was rapidly approaching from the North-west. The gale was severely felt in nearly all localities on the 16th and several casualties occurred. Str. "John Oades" went ashore on the south side of Kelly's Island, Lake Erie and the Str. "C. M. Johnson" sank near Amherstburg. On the 16th in advance of the same disturbance River, Bay and Fundy stations were warned at 10.40 a.m. for a moderate gale but here as over the Lakes the gale was as a rule severe. Shippegan reports "gale very severe, fishing boats ashore and many trees blown down." Tignish says "heaviest gale of season, Schooner Glen driven ashore also another schooner ashore at Campbellton, boats were driven out to sea." Signals were lowered on the Lakes and the Bay of Fundy on the morning of the 17th and elsewhere the following morning.

6. Lake Superior was warned at 10.05 p.m. on the 17th for a moderate S.W. to N.W. gale in advance of a North-west depression. The depression having become more important by morning cautionary were changed to storm signals and the latter were at the same time extended to all the Lakes. On the 19th a heavy gale was everywhere experienced. Port Arthur reports all steamers were greatly delayed. The "Mystic Star" was driven ashore on Lime Barrel Shoal, Lake Ontario.

At 11 a.m. on the 19th all Eastern Canada was warned for a moderate S.W. to N.W. gale in advance of this storm; however it became much less important as it neared the Atlantic and a gale was subsequently only locally experienced chiefly in the Bay of Fundy. Signals were lowered in the Lake Region at 4 p.m. on the 19th and elsewhere at 10 a.m. on the 20th.

7. Between the night of the 21st and during the 22nd a heavy S.W. to N.W. gale prevailed throughout the Lake Region. Port Arthur reports it as a very violent storm. The gale was caused by a disturbance from the North-west. It was warned at 10.40 a.m. on the 21st, storm signal No. 4 being then ordered up. Signals were lowered at 10 a.m. on the 21st.

8. At 10.40 a.m. on the 25th Bay of Fundy Stations were warned for a moderate S.W. to N.W. gale and the same afternoon a north-west gale occurred at St. John and St. Andrews. Signals were lowered at 10.10 a.m. on the 26th.

9. All Lake Stations except those on Superior were warned at 10.20 p.m. on the 25th for a moderate W. to N. gale. A gale afterwards between the 27th and 28th prevailed at all places

notified but it is generally reported to have been very heavy. Burlington Beach says water in channel dropped ten feet during the storm. A report from Port Colborne says the Schooner "George W. Davies" went ashore above Port Maitland and further that she was the only vessel that ventured out in the face of the warnings given of the coming storm. This warning was issued owing to the passage of a disturbance from the North-west. As it progressed all Eastern Canada Stations were notified to expect a moderate gale, but here also the gale although general, exceeded in several localities the force anticipated by the signal displayed but not in such a large number of cases as in the Lake Region. Lake cones were lowered at 6 p.m. on the 28th and the others at 9.50 p.m. the same evening.

10. At 11 p.m. on the 31st all Lakes except Superior were warned for a moderate W. to N.W. gale. Next day the winds reached the anticipated force in some localities but not by any means generally. Signals were lowered at 10.40 a.m. on the 1st.

11. In advance of a severe storm travelling up the Atlantic coast, all Eastern Canada Stations were warned for a heavy easterly gale at 10.20 p.m. on the 21st. Next day there was a heavy gale throughout the districts notified. It is reported to have been very destructive to the fishing nets. Amongst the large number lost Herring Cove reports 60, Prospects 100, Portuguese Cove 90, Devils Island 14, Furguson's Cove 12. Much destruction was also caused on land. Signals were lowered at 9.40 p.m. on the 1st.

#### TORONTO OBSERVATORY MAGNETIC REVIEW FOR OCTOBER, 1895.

Mean Westerly Declination.....	4°	46'0
Mean Horizontal Force.....	0°	16641
Mean Vertical Force.....	0°	60332

DECLINATION:—The magnet was disturbed during the early morning hours of the 1st., at 2<sup>h</sup> 20<sup>m</sup> a slow westerly movement began, at 3<sup>h</sup> 32<sup>m</sup> a reading of 18°4 west of normal and at 4<sup>h</sup> 35<sup>m</sup> a reading of 14°2 east of normal was recorded after which there was a recovery to normal and a fairly steady curve for the remainder of the day. At 1<sup>h</sup> 45<sup>m</sup> of the 2nd. there was a sharp westerly movement of 9' followed at 2<sup>h</sup> by a slow easterly change of 16'. On the 4th. between 7<sup>h</sup> 23<sup>m</sup> and 8<sup>h</sup> 25<sup>m</sup> there were several pronounced deflections both east and west and slight disturbance continued until about 10<sup>h</sup> of the 6th, then a steady curve for nearly a week. A disturbance which began at 15<sup>h</sup> of the 12th lasted until noon of the 13th, the curve was then normal until 19<sup>h</sup>, at 21<sup>h</sup> 25<sup>m</sup> a quick easterly movement of the magnet set in and by 22<sup>h</sup> 10<sup>m</sup> the reading was 52°0 east of its mean position, it then oscillated rapidly for a brief period and at 22<sup>h</sup> 39<sup>m</sup> the return westerly swing began and by 23<sup>h</sup> 25<sup>m</sup> the magnet was again near its mean position and the disturbance gradually lessened. Disturbances were recorded during the evening hours of the three days 14th, 15th and 16th and the early morning hours of the 16th and 17th the most marked deflections were a sudden swing of 21' beginning at 20<sup>h</sup> 53<sup>m</sup> of the 14th and a very decided easterly movement of 27' beginning at 18<sup>h</sup> 50<sup>m</sup> on the 16th. On the 18th between 18<sup>h</sup> 25<sup>m</sup> and 20<sup>h</sup> 30<sup>m</sup> there was an easterly hitch of 12' and on the 19th between 21<sup>h</sup> 50<sup>m</sup> and 22<sup>h</sup> 50<sup>m</sup> another of 10', than a quiet period lasted until the night of the 26th when between 22<sup>h</sup> 46<sup>m</sup> and 23<sup>h</sup> 50<sup>m</sup> a reading 11', east of normal was recorded. The forenoons of both the 27th and 28th were slightly disturbed, a moderate disturbance began at 17<sup>h</sup> 30<sup>m</sup> of the 28th and continued during the night, the most marked deflections were a rapid swing of 21' west at 17<sup>h</sup> 30<sup>m</sup>, an easterly swing of 26' at 19<sup>h</sup> 10<sup>m</sup>, a westerly swing of 22' beginning at 2<sup>h</sup>, an easterly return of 23'5 beginning at 2<sup>h</sup> 35<sup>m</sup> and another westerly swing of 23' beginning at 3<sup>h</sup> also a sharp westerly movement of 11' at 4<sup>h</sup> 21<sup>m</sup>. The magnet was disturbed between 16<sup>h</sup> of 29th and 2<sup>h</sup> of 30th, and again from 16<sup>h</sup> of 30th until midnight. On the 31st there were no important movements.

BIFILAR,—On the 1st between 0<sup>h</sup> and 4<sup>h</sup> the h.f. was slightly disturbed and a little below normal value, again in the evening slight changes were going on, becoming somewhat more marked during the night. The next change worthy of note was a gradual decrease of force on the 4th beginning at 7<sup>h</sup> 10<sup>m</sup>, after 8<sup>h</sup> 15<sup>m</sup> it slowly increased for about an hour and up to the morning of the 9th slight changes were going on and again during the afternoon; a gradual increase at 0<sup>h</sup> 5<sup>m</sup> of the 5th and a more abrupt one at 20<sup>h</sup> 30<sup>m</sup> were the principal movements. The next disturbance began

on the 12th at 7<sup>h</sup> and between 16<sup>h</sup> and 23<sup>h</sup> 16<sup>m</sup> there was a steady decrease, then a recovery began lasting until 2<sup>h</sup> 20<sup>m</sup> of the 13th and was followed by slow waves of disturbance until late in the forenoon and during the evening by rapid changes of lesser amplitude. From the 14th until the 18th the bifilar magnet was a little disturbed but there were no important changes. After this nothing worthy of note was recorded until the 26th when between 7<sup>h</sup> and 8<sup>h</sup> the force decreased slightly and then increased gradually, and small irregularities occurred during the remainder of the day. On the 27th there was a steady decrease of force between 6<sup>h</sup> 40<sup>m</sup> and 7<sup>h</sup> 30<sup>m</sup>, then an increase set in and slow changes were noted up to 14<sup>h</sup>, the range between 6<sup>h</sup> and 10<sup>h</sup> 40<sup>m</sup> when the minimum occurred was 0.00112 C.G.S. The curves for the 28th and 29th showed irregularities, particularly during the early morning hours of the latter day but there were no very pronounced changes. On the 30th between 0<sup>h</sup> and 2<sup>h</sup> a few slow waves of disturbance were recorded but during the balance of that day and all the next, the bifilar continued fairly steady.

VERTICAL FORCE.—During the early morning hours of the 1st the v.f. was slightly below its normal value but increased steadily between 4<sup>h</sup> and 6<sup>h</sup>: From 21<sup>h</sup> to 22<sup>h</sup> and also during the succeeding early morning hours there were indications of a slight decrease but at 2<sup>h</sup> 25<sup>m</sup> the needle returned gradually to its mean position. Shortly after 0<sup>h</sup> of the 5th a slow decrease began and at 0<sup>h</sup> 50<sup>m</sup> an increase followed. On the 12th the needle was disturbed, the force increased between 17<sup>h</sup> and 20<sup>h</sup> and then decreased up to 4<sup>h</sup> 10<sup>m</sup> next day. At 22<sup>h</sup> of the 13th a marked decrease began and lasted twenty-five minutes, after which a short increase is shown followed immediately by a large decrease the minimum reading taking place at 22<sup>h</sup> 50<sup>m</sup>: in a short time the magnet had nearly taken up its normal reading by a slow increase, still between 0<sup>h</sup> and 2<sup>h</sup> of the 14th, the vibrations were numerous but of small amplitude. On the night of the 14th and early morning hours of the 15th and again on the morning of the 17th small changes of force occurred. The magnet was then steady until the morning of the 27th when the curve became undulatory and from this until the end of the month small changes would occasionally occur.

AURORAS.—On the 12th an aurora (Class III) was observed, auroral arch from 7.30 p.m. until after midnight. On the 13th (Class III and IV) at 7.40 p.m. low arch of aurora: 9.30 p.m. bright auroral streamers in N. rising to a good height with irregular arch from East to Northwest, this shortly disappeared and a black bank of cloud was rising in N. At midnight faint auroral light in N. resting on a bank of dark cloud.

On the 1st, 2nd, 3rd, 4th, 5th, 7th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 24th, 26th, 27th and 29th, the sky was clear but no aurora was observed, other nights were cloudy.

R. F. STUPART,  
*Director.*

Meteorological Office,  
Toronto, March 3rd, 1896.





## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

NOVEMBER, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the course of areas of high, and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D. C.

### GENERAL SUMMARY OF THE WEATHER.

Pressure was from 0.05 above average on Lake Supérieur to as much as 0.20 on the Cape Breton Coast. In the North-West Territories, British Columbia and Manitoba it was equal to average or slightly above. Temperature was a little above average in British Columbia. In Quebec and the Maritime Provinces it was from 1° to 2° above the average, but in other portions of Canada it was as a rule not quite up to the average. Eleven low pressure areas were charted, their mean rate of travel was 35.6 miles an hour and their general course was from the westward or north-westward.

The 1st opened with a depression of some importance situated over Maine, which was causing a heavy easterly gale over the Maritime Provinces and the Gulf of St. Lawrence, and heavy rains as far west as Montreal. In other portions of Canada the weather was fair. It cleared at night in Eastern Canada, but the next night rain or sleet again fell very heavily along our Atlantic Coast owing to the influence of another depression which was then passing to the southward.

On the 2nd also, there were light local snowfalls in the North West Territories.

3rd—9th. During the first part of this interval high pressure and fine mild weather prevailed from the Lakes to the Atlantic. On the 7th however there were some showers in Ontario and Quebec, on the 8th they became still more numerous, and on the 9th it rained heavily at first and then turned to snow, the winds at the same time increasing to gales, chiefly in the Lake Region, owing to the development of a depression which moved up from the South-west States and passed a little to the southward of Ontario. The rain extended to the Maritime Provinces during the evening of the 8th and it rained all day of the 9th, but the gale was only locally experienced. In the North-West Territories and Manitoba, the week on the whole was cold and inclined to be unsettled, this latter condition being especially the case in Manitoba on the 5th, when snow and rain fell generally, attended by a gale of wind, and at other times light local falls of snow were of frequent occurrence, mainly confined however to the Territories.

10th—16th. The greater portion of this week was very fine and mild from the Lakes to the Atlantic; on the 14th, however, there were a few light scattered showers in Ontario. The showers became more numerous on the 15th, and at the same time heavy rains were experienced throughout the Maritime Provinces attended by moderate gales. The unsettled conditions were owing to the presence of a shallow depression which had travelled from the north-west, together with the movement of a more important low area up the Atlantic Coast.

In the North-West Territories and Manitoba the first few days of this interval were more or less unsettled with numerous light local snowfalls; but from the 13th it was on the whole fine and quite mild. In Alberta, Assiniboia and Saskatchewan on the 16th the temperature rose to 64° and 67° in the shade, and at Macleod it reached 79°.

17th—23rd. The third week from Ontario to the Maritime Provinces inclusive was pretty much unsettled and chiefly remarkable for the great gale which swept over Eastern Canada on the 21st. During Sunday and Monday showers occurred generally and in the Lake Region the winds increased locally to a gale from the south-west. A feeble depression which had travelled over the North-West Territories began to develop greater energy after reaching the Ohio Valley; by the evening of the 19th it had moved into the Lake Region attended by strong winds and gales from the east and north with snow and rain. Next day as it traversed the St. Lawrence Valley it gave the same unsettled conditions as far as the Atlantic. The same evening the 20th inst., it was reinforced by another disturbance which had either moved in from the Atlantic or developed near the New England coast, and the conjunction of these two depressions occasioned a gale of extreme violence throughout Eastern Canada accompanied by torrents of rain; barometer at Anticosti 21st, reduced to sea level 28.64 inches. A more lengthy description of this storm will be found under the head of "storm warnings." The weather turned decidedly cold in the rear of this great storm and on the morning of the 21st the first temperatures of the winter below zero were recorded in the Georgian Bay and Ottawa Valley regions. There was a light snowfall in the Lower Lake Region on the 22nd, turning to rain in some places on the 23rd. On the latter date snow fell along the St. Lawrence Valley and locally there was as much as five inches; also on the 23rd snow and rain, chiefly rain, fell generally and very heavily over the Maritime Provinces.

In the North West Territories and Manitoba during this week, the general weather conditions were as follows:—17th, fair and cold; 18th, local snowfalls, high winds and rapid movement of anti-cyclone over the country; 19th, high pressure gave way quickly, weather turned mild with local snowfalls, and in the Rocky Mountain slope sleet or rain; 20th, fall of snow in all localities advent of another important anti-cyclone and cold weather, minimum recorded 14°; 22nd and 23rd, light local snow and cold.

24th—30th. The last week of the month was chiefly remarkable for the great gale which occurred over the Lake Region on the 26th. This storm was first noticed as a shallow depression near the coast of Texas on the morning of the 24th. It developed quickly on the 25th and at night was centred near St. Louis, next day it swept over the Lake Region, barometer at Parry Sound reduced to sea-level 29.00 inches. It caused a large amount of damage and gave an excessive and general rainfall. Throughout Quebec and the Maritime Provinces heavy rains were nearly everywhere experienced but the gale was not as a rule severe owing to the fact that the storm became of much feebler energy after leaving the Lake Region. Some fine weather succeeded the storm, but on the 26th, during the presence of a shallow depression there were light rains at first and then light snowfalls. The depression was immediately followed by a north-west cold wave and this brought much colder weather to Ontario and Quebec during the night of the 29th and quite a cold day on 30th except in the Maritime Provinces where the change to colder weather did not take place until night.

In the North-West Territories and Manitoba this fourth week was decidedly cold, not to the same extent however in Alberta as elsewhere. Temperature was generally below zero and the minima varied between  $-10^{\circ}$  to  $-28^{\circ}$ . On the whole the weather was fine, although snow fell in most localities on the 26th, the 27th, and the 30th, but it was usually in very small quantities. No very high winds were recorded.

Vancouver Island reports wells still dry at end of month, snow fell on mountain tops between the 28th and 30th, weather on the whole exceptionally mild and favourable to agriculture and out-door work and the root crop was much benefited. On the upper mainland the month on the whole was fine and free of snow; on lower mainland rain began falling very heavily the early portion of the month.

#### TEMPERATURE.

*The Highest and Lowest Temperature in each Province during November were:*

British Columbia,	70°·0 on 16th at Spence's Bridge,	—	7°·7 on 28th at Stuart's Lake.
North-West Territories,	70°·0 on 16th at Macleod,	—	47°·5 on 28th at Fort Simpson.
Manitoba,	52°·0 on 14th at Portage la Prairie,	—	27°·0 on 27th at Russell.
Ontario,	75°·5 on 6th at Wanstead,	—	26°·8 on 30th at White River.
Quebec,	69°·1 on 13th at Chicoutimi,	—	9°·0 on 25th at Richmond.
New Brunswick,	68°·0 on 8th at Bathurst,		2°·0 on 25th at Bathurst.
Nova Scotia,	67°·0 on 27th at New Glasgow,		10°·4 on 23rd at Truro.
P. E. Island,	66°·0 on 9th at Georgetown,		17°·0 on 24th Georgetown.

Valdez Island, B.C., on the 1st, shock of an earthquake at 3.22 p.m.



PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, NOVEMBER, 1905.

Parameter not reduced to sea level. \* Stations not furnished with registering thermometers.

[illegible]



## PRECIPITATION.

The rainfall during November was above the average in nearly all the provinces, a deficiency only occurring in the North and North-western part of Ontario, the most marked excess occurring in Nova Scotia and part of New Brunswick, also in P.E. Island. In Manitoba and the North-west Territories the amount was about normal.

*The general distribution is as follows :—*

In British Columbia the rainfall was in general 4'06 in., or about 0'66 in. below the average. In some parts of the interior little or no rain has fallen.

In the North-west Territories the rainfall was 0'06 in., or about the average quantity.

In Manitoba the rainfall was 0'12 in., or about the average quantity.

In Ontario, West and South-west District it was 3'85 in., or 1'65 in. above the average. In the North and North-west District it was 1'77 in., or 0'06 in. below the average. In the Central District it was 3'74 in., or 1'80 in. above the average. And in the East and North-east District it was 2'73 in., or 0'94 in. above the average.

In Quebec it was 2'47 in., or 0'86 above the average.

In New Brunswick it was 6'87 in., or 3'67 in. above the average.

In Nova Scotia it was 5'93 in., or 1'28 in. above the average.

In Prince Edward Island it was 5'32 in., or 2'33 in. above the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Port Simpson, 12'98 in.; Rivers Inlet, 19'72 in.; Alberni, 5'02 in.; New Westminster, 5'97 in.; Abbotsford, 6'57 in.; Hazelmere, 5'09 in.; Quatsino, 22'33 in.; Chilliwack, 5'90 in.; Loch Erroch, 8'83 in.; Langley, 6'31 in.; Union, 6'48 in.; Goldstream, 6'25 in.; Beaver Creek, 6'01 in.; Valdez, 7'35 in.

ONTARIO.—Cottam, 5'19 in.; Lansdowne, 5'00 in.; London, 5'41 in.

QUEBEC.—Grindstone, 6'54 in.

NEW BRUNSWICK.—Fredericton, 9'41 in.; St. John, 8'89 in.; St. Andrews, 7'58 in.; Grand Manan, 12'13 in.; Point Lepreaux, 9'46 in.

NOVA SCOTIA.—Halifax, 8'21 in.; Sydney, 6'95 in.; Yarmouth, 7'38 in.; Sable Island, 5'96 in.; Guysborough, 9'69 in.; Truro, 6'52 in.

P. E. ISLAND.—Charlottetown, 5'92 in.

NEWFOUNDLAND.—St. Johns, 5'38 in.; Channell, 7'94 in.

*Rain 1 inch and upwards in 24 hours :—*

1. Port Simpson, 1'23 in.; Rivers Inlet, 1'02 in.; Point Lepreaux, 2'30 in.; St. John, 2'04 in.; Truro, 1'28 in.; Deseronto, 1'22 in.; Charlottetown, 1'11 in.; Halifax, 1'59 in.; Yarmouth, 1'62 in.; St. Andrews, 2'62 in.; Grand Manan, 2'15 in.; Grindstone, 1'65 in.

2. Guysborough, 1'82.

3. Pictou, 1'10 in.; Halifax, 1'11 in.; Yarmouth, 1'24 in.

6. Port Simpson, 1'23 in.

7. Spence, 1'00 in.; Lion's Head, 1'09 in.; Sparrow Lake, 2'20 in.; Emsdale, 1'08 in.

8. Waterford, 2'21 in.; Uplands, 1'37 in.; Aurora, 1'18 in.; Blenheim, 1'72 in.; Oliver's Ferry, 1'10 in.; Wilton Grove, 1'80 in.; Princeton, 1'24 in.; Lansdowne, 1'66 in.; Port Stanley, 1'06 in.

9. Port Simpson, 1'55 in.; Rivers Inlet, 1'04 in.; Quatsino, 1'00 in.; Point Lepreaux, 1'60 in.; Brantford, 2'00 in.; Richmond, 1'48 in.; Fredericton, 2'59 in.; Chatham, 1'07 in.; Alton, 1'28 in.; Virgil, 1'56 in.; Thedford, 1'67 in.; Scarborough, 1'41 in.; Watford, 1'60 in.; Wyoming, 1'28 in.; Port Rowan, 1'07 in.; DeCewsville, 1'04 in.; Cottam, 1'29 in.; London, 1'02 in.; St. Ann's, 1'14 in.; Thorold, 1'54 in.; Agincourt, 1'14 in.; Ennismore, 1'09 in.; Roblins Mills, 1'07 in.; Montague, 1'26 in.; Charlottetown, 1'11 in.; Port Stanley, 1'06 in.

10. Pelee Island, 1'25 in.

11. St. Johns, 1'11 in.

13. Rivers Inlet, 1'73 in.

14. Rivers Inlet, 3'39 in.; Canobie, 1'00 in.; Hazelmere, 1'20 in.; Loch Erroch, 1'82 in.; Quatsino, 2'50 in.; Truro, 1'58 in.

15. Port Simpson, 2'31 in.; Rivers Inlet, 2'81 in.; Quatsino, 4'97 in.; Point Lepreaux, 2'84 in.; Dalhousie, 1'09 in.; New Glasgow, 1'12 in.; Fredericton, 1'42 in.; St. John, 2'53 in.; Cape Magdalen, 1'10 in.; Oliver's Ferry, 1'10 in.; Halifax, 1'35 in.; Yarmouth, 1'12 in.; St. Andrews, 1'47 in.

16. Rivers Inlet, 2·25 in.; Barkerville, 1·10 in.; Channell, 1·37 in.; Grindstone, 1·02 in.
17. Quatsino, 2·93 in.
20. Guysborough, 2·06 in.; Channell, 1·85 in.; Fredericton, 1·08 in.
21. Sydney, 1·37 in.; Grand Manan, 1·25 in.; Sable Island, 1·15 in.
23. Truro, 1·17 in.
24. Guysborough, 1·02 in.; Halifax, 1·07 in.; Sydney, 1·17 in.; Grindstone, 1·20 in.
25. Guysborough, 2·04 in.; Chatham, 1·14 in.; Conestogo, 1·00 in.; St. George, 1·37 in.; Pelee Island, 1·01 in.; Brantford, 1·50 in.; Port Rowan, 1·18 in.; Durham, 1·60 in.; Lakefield, 1·73 in.; Cowal, 1·76 in.; Deer Park, 1·57 in.; Orangeville, 1·35 in.; Cherry Valley, 2·02 in.; Princeton, 1·73 in.; Goldstream, 1·30 in.; Dealtown, 1·69 in.; Roblins Mills, 1·20 in.; Jernyn, 1·00 in.; Westport, 1·83 in.; Sparrow Lake, 1·70 in.; Arden, 1·82 in.; Thedford, 1·11 in.; Watford, 1·55 in.; Emsdale, 1·45 in.; Ursa, 1·47 in.; Grand Manan, 4·43 in.; Toronto, 1·18 in.
26. Rivers Inlet, 1·33 in.; Abbotsford, 1·00 in.; Channell, 2·35 in.; Point des Monts, 1·00 in.; Alton, 1·50 in.; Paris, 1·83 in.; St. Mary's, 1·10 in.; Haliburton, 1·65 in.; Peterborough, 1·09 in.; DeCewsville, 1·33 in.; Cottam, 1·52 in.; London, 1·01 in.; Coldwater, 1·24 in.; Bancroft, 1·11 in.; Agincourt, 1·46 in.; Stouffville, 1·39 in.; Blenheim, 1·55 in.; Roblins Mills, 1·05 in.; Lansdowne, 2·62 in.; Montague, 1·45 in.; Parma, 1·52 in.; Keene, 1·10 in.; Scarborough, 1·75 in.; Croydon, 2·62 in.; Port Stanley, 1·55 in.; Montreal, 1·23 in.
27. Rivers Inlet, 1·00 in.; Quatsino, 1·35 in.; Fredericton, 1·75 in.; Chatham, 1·40 in.
29. Spence's Bridge, 1·02 in.; Alberni, 1·22 in.; Quatsino, 1·40 in.

The snowfall throughout the Dominion has been below the average except in Manitoba.

*The distribution is as follows :—*

In the same Districts of Ontario as shown in the rainfall, the amounts are 3·8 in., or 4·8 in. below the average; 15·2 in., or 0·8 below the average; 3·9 in., or 2·1 in. below the average; 7·8 in., or 0·5 in. below the average.

In Quebec it was 17·8 in., or 5·3 in. below the average.

In New Brunswick it was 8·1 in., or 0·6 in. below the average.

In Nova Scotia it was 1·4 in., or 2·6 in. below the average.

In Prince Edward Island it was 5·7 in., or 3·0 in. below the average.

In Manitoba it was 7·3 in., or about 2·3 in. above the average.

In the North-west Territories it was 6·3 in., or 0·9 in. below the average.

In British Columbia the fall varied from none on the Coast to 7·4 in. in the interior, or about 4 in. on the average, or 7 in. less than in November, 1894.

*Snowfall 6 inches and upwards during the month :*

BRITISH COLUMBIA.—Donald, 15 in.; Pilot Bay, 10 in.; Midway, 7 in.; Enderby, 9 in.; Stuart's Lake, 19 in.; Griffin Lake, 13 in.; Barkerville, 23 in.; Glacier 74 in.

N. W. TERRITORIES.—Prince Albert, 16 in.; Indian Head, 9 in.; Banff, 16 in.; Henrietta, 13 in.; Qu'Appelle, 8 in.; Battleford, 6 in.

MANITOBA.—Treherne, 9 in.; Pipestone, 9 in.; Brandon 11 in.; Russell, 6 in.; Channel Island, 13 in.; Hillview, 18 in.; Elkhorn, 13 in.; Turtle Mountain, 13 in.; Oakbank, 8 in.; Rapid City, 10 in.; Norquay, 8 in.; Hartney, 9 in.; Gretna, 7 in.; Evandale, 7 in.

ONTARIO.—Beatrice, 28 in.; Alton, 9 in.; Huntsville, 17 in.; Birnam, 8 in.; Haliburton, 12 in.; Peterborough, 7 in.; Lucknow, 12 in.; London, 8 in.; Coldwater, 17 in.; Deseronto, 6 in.; Lindsay, 10 in.; Haileybury, 18 in.; Durham, 17 in.; Ottawa, 6 in.; Missanabie, 12 in.; Savanne, 11 in.; Heron Bay, 10 in.; North Bruce, 12 in.; Schreiber, 9 in.; Biscotasing, 16 in.; Gravenhurst, 16 in.; Bancroft, 14 in.; Calvin, 25 in.; Burk's Falls, 19 in.; Lakefield, 8 in.; Mattawa, 19 in.; Clontarf, 16 in.; Renfrew, 12 in.; Whiteside, 16 in.; Bognor, 20 in.; Spence, 24 in.; Uplands, 20 in.; Collingwood, 10 in.; Orillia, 18 in.; Sprucedale, 19 in.; Ursa, 14 in.; Bobcaygeon, 7 in.; Emsdale, 19 in.; Thompson, 9 in.; Warton, 22 in.; Thedford, 9 in.; Sparrow Lake, 19 in.; Westport 6 in.; Mount Forest, 10 in.; Coldstream, 13 in.; Denbigh, 19 in.; Wilton Grove, 6 in.; Sunshine, 7 in.; Orangeville, 9 in.; Midland, 13 in.; Presqu'Isle, 22 in.; Rockliffe, 18 in.; Saugeen, 15 in.; White River, 10 in.

QUEBEC.—Brome, 6 in.; Richmond, 14 in.; Point des Monts, 20 in.; Bicquet, 44 in.; Cape Magdalen, 13 in.; Father Point, 20 in.; Quebec, 19 in.; Gaspé, 6 in.; Grindstone, 7 in.

N. BRUNSWICK.—Point Lepreaux, 6 in.; Dalhousie, 9 in.; Fredericton, 6 in.; Bathurst, 14 in.; Chatham, 16 in.; Point Escuminac, 14 in.

P. E. ISLAND.—Georgetown, 7 in.

*Snow 3 inches and upwards in 24 hours :—*

1. Point des Monts, 4 in.; Bicquet, 9 in.; Uplands, 3 in.; Quebec, 5 in.
2. Barkerville, 3 in.; Grenfell, 3 in.
3. Point Lepreaux, 5 in.; Pictou, 3 in.; Fredericton, 3 in.
4. Pilot Bay, 3 in.; Indian Head, 3 in.
5. Alameda, 8 in.; Cannington Manor, 4 in.; Pipestone, 6 in.; Brandon, 6 in.; Norquay, 5 in.; Hillview, 12 in.; Elkhorn, 5 in.; Turtle Mountain, 11 in.; Rapid City, 5 in.; Hartney, 5 in.; Emsdale, 5 in.
6. Alameda, 4 in.; Norquay, 4 in.; Hartney, 5 in.
7. Donald, 3 in.; Barkerville, 5 in.
8. Point des Monts, 3 in.
9. Calvin, 6 in.; Spence, 8 in.; Sprucedale, 3 in.; Denbigh, 3 in.; Wiarton, 5 in.; Thompson, 3 in.; Emsdale, 5 in.; Saugeen, 3 in.
10. Dalhousie, 3 in.; Bathurst, 6 in.; Gaspé, 3 in.; Point des Monts, 5 in.; Bicquet, 7 in.; Uplands, 5 in.; Haileybury, 4 in.; Burk's Falls, 4 in.; Mattawa, 7 in.; Whiteside, 3 in.; Bognor, 5 in.; Rockliffe, 5 in.; Father Point, 5 in.; Quebec, 3 in.
11. Cape Magdalene, 4 in.
12. Biscotasing, 3 in.
13. Donald, 3 in.
14. Moose Jaw, 9 in.; Georgetown, P.E.I., 3 in.
15. Channell, 4 in.; Channell Island, 3 in.; Biscotasing, 4 in.; Qu'Appelle, 4 in.
16. Pipestone, 3 in.; Burk's Falls, 7 in.; Mattawa, 8 in.; Orillia, 4 in.; Sprucedale, 8 in.; Rapid City, 3 in.; Presqu'Isle, 12 in.; Midland, 4 in.; Denbigh, 4 in.; Sparrow Lake, 5 in.; Wiarton, 6 in.; Emsdale, 7 in.; Ursa, 3 in.; Prince Albert, 3 in.
17. Barkerville, 6 in.; Channell Island, 4 in.; Elkhorn, 5 in.; Brome, 6 in.; Beatrice, 12 in.; Alton, 3 in.; London, 7 in.; Coldwater, 3 in.; North Bruce, 4 in.; Gravenhurst, 3 in.; Bancroft, 3 in.; Calvin, 8 in.; Whiteside, 6 in.; Bognor, 7 in.; Owen Sound, 5 in.; Spence, 10 in.; Uplands, 6 in.; Coldstream, 4 in.; Prince Albert, 3 in.; Rockliffe, 4 in.; Saugeen, 4 in.
18. Richmond, 6 in.; Bicquet, 8 in.; Bognor, 4 in.; Collingwood, 3 in.; Wilton Grove, 4 in.; Coldstream, 8 in.; Ursa, 3 in.; Father Point, 5 in.; Montreal, 4 in.
19. Richmond, 4 in.; Heron Bay, 5 in.; Bancroft, 4 in.; Orillia, 3 in.; Denbigh, 5 in.; Thedford, 5 in.
20. Bathurst, 6 in.; Bicquet, 5 in.; Coldwater, 5 in.; Lindsay, 4 in.; Durham, 8 in.; Ottawa, 3 in.; Clontarf, 4 in.; Renfrew, 4 in.; Whiteside, 4 in.; Presqu'Isle, 3 in.; Midland, 4 in.; Westport, 3 in.; Sparrow Lake, 3 in.; Montague, 3 in.; Smith's Falls, 3 in.; Arden, 3 in.; Bobcaygeon, 3 in.; Ursa, 3 in.; Montreal, 6 in.
21. Gaspé, 3 in.; Denbigh, 6 in.
22. Richmond, 6 in.; Bathurst, 4 in.; Bicquet, 5 in.; Alton, 3 in.; Lindsay, 4 in.; Haileybury, 4 in.; Durham, 8 in.; Ottawa, 3 in.; North Bruce, 3 in.; Gravenhurst, 4 in.; Bancroft, 4 in.; Spence, 5 in.; Calvin, 3 in.; Burk's Falls, 3 in.; Clontarf, 4 in.; Renfrew, 5 in.; Orillia, 3 in.; Sprucedale, 3 in.; Midland, 4 in.; Orangeville, 6 in.; Sparrow Lake, 6 in.; Wiarton, 9 in.; Thompson, 6 in.; Emsdale, 3 in.; Bobcaygeon, 4 in.; Saugeen, 4 in.; Quebec, 4 in.
23. Vernon, 1 in.; Kamloops, 3 in.; Mission Valley, 3 in.; Pilot Bay, 4 in.; Barkerville, 3 in.; Bicquet, 4 in.; Griffin Lake, 4 in.; Stuart's Lake, 3.5 in.; Dalhousie, 3 in.; Point des Monts, 4 in.; Haileybury, 3 in.; Father Point, 4 in.
24. Donald, 6 in.; Griffin Lake, 6 in.; Stuart's Lake, 5 in.; Enderby, 5 in.; Indian Head, 3 in.; Hillview, 4 in.; Elkhorn, 3 in.; Coldwater, 3 in.; Missanabic, 3 in.; Heron Bay, 3 in.; Renfrew, 3 in.; Banff, 6 in.
25. Barkerville, 6 in.; Stuart's Lake, 6 in.; Savanne, 3 in.
26. Bicquet, 4 in.; Haileybury, 4 in.; Missanabic, 3 in.; Schreiber, 3 in.
27. Enderby, 4 in.; Channel Island, 6 in.; Cape Magdalene, 3 in.; Biscotasing, 3 in.

*Aurora recorded.*

*Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (IV) the feeblest in brilliancy.*

7. Chicoutimi.
8. Fort Simpson, Savanne.
9. Pincher Creek, Calgary, IV; Moose Jaw, IV; Alameda, III; Cannington Manor, II; Grenfell, Treherne, II; Russell, Hillview, I; St. Albans, II; Elkhorn, II; Savanne, Pembina Crossing, II; Belmont, Winnipeg, III; Port Arthur, IV; Qu'Appelle, III; White River, I; Toronto, II.
10. Pincher Creek, Fort Simpson, Grenfell, Treherne, III; Hillview, III; St. Albans, II; Savanne, Pembina Crossing, II; Belmont, Minnedosa, IV; Port Arthur, I.
11. Alameda, III; Fort Simpson, Richmond, I; Truro, IV; Savanne, Medicine Hat, II; Edmonton, III; Calgary, IV; Port Arthur, I.



12. Calgary, II; Truro, IV; Grand Manan, IV; Port Arthur, II.
13. Elkhorn II; Chicoutimi, IV.
14. Moose Jaw, IV; Treherne, II; Pembina Crossing, III.
15. Moose Jaw, IV; Alameda, IV; Greffell, Hillview, IV; Haileybury, Minnedosa, IV.
17. Fort Simpson, Hillview, III; Pembina Crossing, IV.
18. Treherne, II.
20. Moose Jaw.
21. Hillview, IV; Winnipeg, IV; Minnedosa IV.
22. Treherne, III; Hillview, Savanne, Pembina Crossing, III; Prince Albert, II; Medicine Hat, IV.
23. Henrietta, I; Hillview, IV; Haileybury, IV; Savanne, Stouffville, Georgetown, IV; Pembina Crossing, III; Winnipeg, III; Swift Current, II; Prince Albert, I; Minnedosa, IV; Toronto, III.
24. Treherne, III; Deseronto, Calvin, St. Ann's, IV; Minnedosa, I; Quebec, IV.
25. Prince Albert, I.
26. Moose Jaw, Prince Albert, I.
27. Fort Simpson.
28. Fort Simpson.

# PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER.

STATIONS.	RAINFALL.					SNOWFALL.				
	Amount in inches.	No. of Days of or Over	No. of Fair Days.	Heaviest fall in Month.	Date	Amount in inches.	Number of Days.	Heaviest Fall in Month.	Date	
<b>BRITISH COLUMBIA—</b>										
Langley .....	6.31	15	14	1.36	14	.....	.....	.....	.....	
Nanaimo .....	3.37	11	10	0.92	28	.....	.....	.....	.....	
Union .....	6.48	17	13	1.67	28	1	.....	.....	.....	
Goldstream Lake .....	6.25	16	14	0.94	13	.....	.....	.....	.....	
Beaver Creek .....	6.01	16	14	4.51	13	.....	.....	.....	.....	
Salt Spring Island .....	2.73	10	20	0.79	13	.....	.....	.....	.....	
Quamichan (2) .....	2.60	16	16	0.85	14	.....	.....	.....	.....	
Valdez .....	7.25	18	18	1.26	14	.....	.....	.....	.....	
<b>MAINTOYA—</b>										
Turtle Mountain .....	.....	.....	25	.....	.....	17.3	5	11.0	5	
Pilot Mound .....	.....	.....	28	.....	.....	2.0	8	2.0	.....	
Oakbank .....	0.70	1	21	0.70	5	8.0	5	2.0	13	
Rapid City .....	.....	.....	27	.....	.....	19.0	8	5.0	.....	
Pembina Crossing .....	.....	.....	29	.....	.....	.....	5	.....	.....	
Greenwood .....	0.40	6	22	0.35	.....	.....	2	4.5	6	
Norway .....	.....	.....	22	.....	.....	.....	9	0.5	.....	
Morden .....	0.59	2	20	0.50	5	0.5	5	4.5	28	
Hartney .....	.....	.....	25	.....	.....	5.0	5	.....	.....	
Gretna .....	R	.....	21	.....	.....	6.5	5	2.0	.....	
Belmont .....	.....	.....	25	.....	.....	.....	5	.....	.....	
Evandale .....	0.12	1	20	0.12	5	7.0	9	4.6	5	
<b>ONTARIO—</b>										
Aurora .....	2.51	8	20	1.19	9	1.3	6	1.8	23	
Blenheim .....	4.85	8	17	1.72	9	.....	2	.....	.....	
Presque Isle .....	2.93	9	17	0.77	8	22.0	9	12.0	19	
Midland .....	1.32	16	16	0.60	24	13.0	6	5.0	20	
Oswego .....	4.19	8	26	0.25	.....	.....	.....	.....	.....	
Georgetown .....	3.80	11	17	1.00	.....	4.1	6	2.1	22	
Oliver's Ferry .....	3.37	6	.....	1.10	.....	0.3	.....	.....	.....	
Deer Park .....	4.11	14	.....	.....	.....	3.0	11	.....	.....	
Orangeville .....	3.23	8	20	1.35	25	9.0	4	5.8	.....	
Emmerson .....	2.59	4	24	1.00	9	1.0	4	2.0	.....	
Sunshine .....	2.11	9	16	0.31	9	6.9	4	3.0	.....	
Wilton Grove .....	1.62	9	.....	1.80	8	19.0	5	6.0	.....	
Denbigh .....	1.02	9	24	0.52	26	.....	.....	.....	.....	
Cherry Valley .....	4.20	7	.....	2.62	.....	1.0	1	1.0	.....	
Princeton .....	3.86	11	18	1.73	.....	2.5	1	2.0	.....	
Coldstream .....	2.94	13	15	1.29	.....	.....	.....	.....	.....	
Mount Forest .....	2.24	9	15	0.85	25	10.3	11	2.5	.....	
Dealtown .....	1.92	10	19	1.75	.....	0.5	1	0.5	.....	
Roblin's Mills .....	4.31	8	.....	1.29	25	0.9	3	0.5	.....	
Wooler .....	0.81	4	.....	0.75	.....	4.0	.....	2.0	.....	
Jermyn .....	2.79	9	.....	0.63	.....	.....	.....	.....	.....	
Laundowne .....	4.00	6	.....	2.62	.....	2.0	.....	2.0	.....	
Don's Head .....	3.65	5	.....	1.29	.....	.....	.....	.....	.....	
Westport .....	1.10	10	18	1.81	.....	7.5	4	3.2	.....	
Sparrow Lake .....	1.50	3	23	2.24	.....	18.5	5	6.5	.....	
Montague .....	3.38	7	.....	1.45	26	3.0	5	3.0	.....	
Smith's Falls .....	2.09	7	.....	1.29	8	5.3	5	3.0	.....	
Parma .....	3.60	9	.....	1.52	.....	1.9	2	.....	.....	
Arden .....	3.72	9	.....	1.82	16	3.5	1	3.5	.....	
Theftford .....	3.63	6	.....	1.67	.....	0.0	4	.....	.....	
Keene .....	3.19	5	.....	0.85	26	.....	4	.....	.....	
Warton .....	1.22	5	.....	0.85	7	22.0	4	.....	.....	
Thompson .....	1.60	2	.....	3.00	12	9.0	4	6.0	.....	
Scarborough .....	4.22	9	16	1.55	.....	1.0	5	.....	.....	
Watford .....	3.30	6	.....	1.75	.....	.....	.....	.....	.....	
Ensdale .....	2.72	4	20	1.45	25	19.0	7	5.0	19	
Bohysagon .....	1.53	6	21	0.52	26	7.5	7	4.0	.....	
Wyoming .....	3.41	6	22	1.98	9	3.9	3	1.0	.....	
Ursa .....	2.59	8	.....	1.45	.....	14.1	4	.....	.....	
Croydon .....	2.62	7	.....	1.44	26	5.3	3	.....	.....	
Nottawasaga Island .....	0.60	2	21	0.50	19	13.0	1	1.0	20	
<b>NEW BRUNSWICK—</b>										
Point Escomine .....	3.76	7	20	1.18	26	14.0	5	7.0	25	
<b>NOVA SCOTIA—</b>										
Port Morien .....	4.24	11	19	1.05	14	1.5	1	1.5	3	

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF NOVEMBER, 1895.

HOURS ENDING

	5 A.M.	6 A.M.	7 A.M.	8 A.M.	9 A.M.	10 A.M.	11 A.M.	NOON	1 P.M.	2 P.M.	3 P.M.	4 P.M.	5 P.M.	6 P.M.	7 P.M.	8 P.M.
ESQUIMAULT .....	..	..	..	0.03	0.16	0.23	0.24	0.21	0.25	0.27	0.30	0.19	0.02	..	..	..
KUPEE ISLAND.....	..	..	..	0.00	0.00	0.14	0.25	0.30	0.26	0.37	0.27	0.15	8	..	..	..
AGASSIZ, B. C. ....	..	..	..	0.00	0.05	0.18	0.20	0.29	0.32	0.27	0.26	0.21	0.02	..	..	..
BATTLEFORD .....	..	..	..	0.05	0.17	0.20	0.41	0.37	0.36	0.27	0.18	0.01	0.00	..	..	..
INDIAN HEAD.....	..	..	..	0.00	0.10	0.37	0.40	0.49	0.45	0.40	0.13	0.00	0.00	..	..	..
BRANDON.....	..	..	..	0.00	0.07	0.24	0.38	0.35	0.38	0.41	0.42	0.34	0.02	..	..	..
WINNIPEG.....	..	..	..	0.03	0.23	0.31	0.40	0.43	0.40	0.39	0.32	0.21	0.02	..	..	..
WOODSTOCK .....	..	..	..	0.03	0.20	0.41	0.44	0.42	0.38	0.31	0.25	0.26	0.07	..	..	..
TORONTO.....	..	..	..	0.11	0.30	0.46	0.50	0.43	0.36	0.31	0.21	0.24	0.02	..	..	..
LINDSAY.....	..	..	..	0.04	0.21	0.38	0.39	0.34	0.29	0.25	0.10	0.09	0.03	..	..	..
BARRIE.....	..	..	..	0.01	0.26	0.39	0.32	0.27	0.24	0.21	0.23	0.21	0.04	0.01	..	..
KINGSTON.....	..	..	..	0.05	0.23	0.36	0.32	0.30	0.15	0.44	0.35	0.21	0.03	..	..	..
MONTREAL.....	..	..	..	0.10	0.21	0.29	0.32	0.25	0.20	0.33	0.35	0.18	0.00	..	..	..
FREDERICTON.....	..	..	..	0.07	0.33	0.35	0.42	0.48	0.44	0.43	0.43	0.36	0.07	..	..	..

	ESQUIMAULT	KUPEE ISLAND	AGASSIZ	BATTLEFORD	INDIAN HEAD	BRANDON	WINNIPEG	WOODSTOCK	TORONTO	LINDSAY	BARRIE	KINGSTON	MONTREAL	FREDERICTON
MEAN PROPORTION FOR MONTH..... (Constant sunshine being 1.)	0.20	0.20	0.19	0.23	0.26	0.29	0.30	0.29	0.33	0.23	0.22	0.31	0.27	0.35
MAXIMUM DAILY AMOUNT.....	0.90	0.72	0.71	0.81	0.70	0.84	0.86	0.88	0.91	0.81	0.87	0.90	0.97	0.90
DATE .....	21	21	22	12	23	17	25	27	27	27	28	21	30	24
NO. OF DAYS COMPLETELY CLOUDED.....	14	12	13	12	12	9	7	12	6	11	13	9	14	8

PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 584. These were divided as follows :—

DISTRICT.	No. Issued.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	78	58	10	10	80.8
LOWER LAKE REGION .....	114	92	14	8	86.8
UPPER ST. LAWRENCE .....	101	83	13	5	88.6
LOWER ST. LAWRENCE .....	97	81	11	5	89.2
GULF .....	97	85	6	6	90.7
MARITIME PROVINCES .....	97	78	10	9	85.6
TOTAL .....	584	477	64	43	87.2

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from the agents at all observing stations, as well as the telegraphic reports, are used.

The daily probabilities were issued by Probability Officer B. C. Webber.

## STORM WARNINGS.

During the month warnings on the approach of 6 storms were issued to our agents, and cautionary signals displayed at the various signal stations. The total number of warnings issued was 200, of which 184 were verified. At 3 stations, however, the force did not reach that indicated by the signals. 12 stations reported warnings late, 5 owing to issue, and 7 to delay. 1 station reported a storm for which no warning was issued.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 184 warnings verified as to force, 133 or 72·3 per cent were fully, and 184 or 100 per cent were fully and partially verified as to direction.

No. 1. Lake Superior stations were warned at 10.30 a.m. of the 3rd. for a moderate easterly gale, in advance of a depression then over the Western States. This, however, passed over Lake Superior without giving any storm.

No. 2. At 10 a.m. on the 5th, Lake Superior stations were warned for a strong easterly gale, in advance of a depression then over Dakota. From thence it passed due north, giving only a moderate southerly gale on Lake Superior.

No. 3. In consequence of a depression which was developing slightly to the south of the Lakes, all stations on the Lakes, excepting Lake Superior, were warned for a moderate west to north gale. A moderate gale prevailed on the Lakes during the 9th and 10th from the N.E. and N.W. In advance of the same depression all eastern stations were warned at 10 p.m. on the same day. The depression passed across Eastern Canada as an area of not much energy. It however caused a moderate to fresh gale in the upper portion of the Gulf of St. Lawrence, on the Cape Breton coast and in the Bay of Fundy.

No. 4. Lake Superior stations were warned at 10 a.m. on the 13th, to expect a strong gale, for a depression then over Nebraska. This passed northward, but did not become important and no storm occurred on the lake.

No. 5. At 10 a.m. on the 19th, all lake stations, excepting Lake Superior, were warned to expect a strong gale from the W. and N., and at 3 p.m. the same afternoon, all eastern stations were warned for a strong easterly gale. This was in consequence of a depression which was developing in the morning over the Ohio Valley. From thence passing to the Maritime Provinces it was joined by another disturbance which had moved northward between the Atlantic Coast and Bermuda. The first depression caused a strong gale on the lakes warned, attended by snow and rain during the night of the 19th; and on the 20th, at Sarnia, it was reported as a furious gale and at Port Stanley as a very severe storm. 48 miles per hour from the N.E. was recorded at Presqu'Isle, 45 from the N. at Goderich and 34 from the N.W. at Toronto. In Eastern Canada the combined system caused a very important storm, the barometer at Anticosti Island, on the morning of the 21st, falling to 28·64 in. A very heavy gale from the S. and W. set in throughout Eastern Canada on the morning of the 20th. Halifax reports this as the "heaviest gale for years," the squalls were terrific, three small schooners dragged their anchors and went ashore, and another small schooner, the "Reaper," missed the channel and went ashore on the sand and was broken by the heavy seas. At Canso, N.S.: The "storm was very heavy and blew a perfect hurricane." Tignish, P.E.I., says: "This was a terrible gale." Souris, P.E.I.: "It blew a hurricane, strongest gale this season." Liscomb, N.S.: "Heavy gale with tremendous seas." Pictou, N.S.: "Strongest gale since 1873." Yarmouth, N.S.: "The seas broke from the ground right across the harbour at the entrance and no vessel could have entered at the time." By the morning of the 22nd the storm had passed north-eastward across Newfoundland.

No. 6. At 10 a.m. on the 21st, Lake Superior stations were warned for a strong westerly gale, in advance of a depression then over the middle western States, which however passed south-eastward and no storm occurred on the lake.

No. 7. At 10 a.m. on the 25th, Lakes Huron, Erie, Ontario and the Georgian Bay stations were warned for a strong easterly gale, and at 11 a.m. all Lake Superior stations were warned for a strong westerly gale, in advance of a depression which was over the middle Mississippi Valley and moving north-eastward. Signs were soon shown of the development of the storm, and all eastern stations were warned at noon on the same day. On reaching the Lakes it had developed considerable energy. Next morning, the 26th, it was central near Parry Sound as a severe storm: barometer reduced to sea level 29·00 inches. Afterwards as it passed down the St. Lawrence River it quickly became of less importance and its accompanying gale over Eastern Canada was not as a rule heavy. In the Lake Region, however, it occasioned one of the greatest gales on record, and much destruction of

property is reported from nearly all places. Goderich recorded 67 miles per hour, and 61 for twenty-four consecutive hours. Port Stanley anemometer gave 72 miles per hour, and our agent there says it was the severest storm for some years. A scow lying in the piers parted her lines and was swept out into the lake, and trees along the beach were blown down. Presqu'Isle anemometer recorded at times a velocity of 72 miles per hour. Midland says: "The greatest storm in many years, the new fog station on Double Top Rock had its windows broken and was also damaged by waves." "The rock stands 22 feet above water." The anemometer at Toronto Island recorded in gusts at the rate of 72 miles an hour and an hourly velocity of 59 miles.

TORONTO OBSERVATORY—MAGNETIC REVIEW FOR NOVEMBER, 1895.

Mean westerly declination.....	4°46'6
Mean horizontal force.....	0'16641
Mean vertical force.....	0'60278

*Declination.*—On the 1st, between 0<sup>h</sup> 50<sup>m</sup> and 2<sup>h</sup> 20<sup>m</sup> the magnet moved 24' west, and at 1<sup>h</sup> 20<sup>m</sup> next day a rapid easterly swing of 22' set in the minimum being reached at 1<sup>h</sup> 53<sup>m</sup>. On the 3rd at 2<sup>h</sup> 57<sup>m</sup> a quick westerly deviation was shewn, and a larger one next morning at 3<sup>h</sup> 42<sup>m</sup> the change amounting to 15' in a short time. Between 1<sup>h</sup> 50<sup>m</sup> and 3<sup>h</sup> 30<sup>m</sup> of the 8th, the magnet was much disturbed the position being west of the normal during this interval. On the evening of the 9th an important storm was registered and it was particularly active between 18<sup>h</sup> 30<sup>m</sup> and 20<sup>h</sup> 30<sup>m</sup> and again from 22<sup>h</sup> 48<sup>m</sup> to 23<sup>h</sup> 35<sup>m</sup>. The general effect of the disturbance was to keep the magnet east of the normal and the most important movement was an easterly swing of 41' between 19<sup>h</sup> 42<sup>m</sup> and 19<sup>h</sup> 53<sup>m</sup>. From the 10th to the 12th a decided disturbance prevailed, the changes were most pronounced during the night of the 10th and afternoon and evening of the 11th. A very marked deflection of 38' was registered on the 10th between 23<sup>h</sup> 57<sup>m</sup> and 24<sup>h</sup> 40<sup>m</sup>.

On the 13th, 14th and 15th there was slight disturbance, and on the night of the 23rd and morning of the 24th some important swings were recorded. After the 24th the needle remained slightly disturbed during the remainder of the month.

*Horizontal Force.*—The bifilar was a little disturbed after 2<sup>o</sup> of the 8th and remained so until 3<sup>h</sup> 25<sup>m</sup>, the force during the interval being slightly below normal. There was disturbance again of the 9th between 18<sup>h</sup> and 21<sup>h</sup>, but no large departures from normal were recorded. On the 10th, 11th and 12th constant changes of force were going on, the curve was somewhat undulatory on the night of the 10th and minute vibrations were shewn early next morning. During the afternoons of the 13th and 15th the force was slightly below normal value and again so on the 23rd and early morning hours of the 24th. After 8<sup>h</sup> of the 24th the force gradually decreased and remained slightly below the normal for several hours; slight changes were noticed occasionally up to the end of the month.

*Vertical Force.* The only disturbance of the *z.f.* registered during the month occurred on the night of the 23rd and early hours of the 24th, during which time the force was below normal.

*Aurora.* Class II was observed on the 10th, at 23<sup>h</sup> 25<sup>m</sup> partial clearing exposed fine aurora in north. On the 23rd aurora, class III, with faint streamers. On the 2nd, 3rd, 4th, 5th, 12th, 20th, 21st, 27th and 28th the sky was clear but no aurora was observed, other nights were cloudy.

R. F. STUPART,  
*Director.*

Meteorological Office,  
Toronto, March 27th, 1896.

## METEOROLOGICAL SERVICE, DOMINION OF CANADA.

# Monthly Weather Review.

DECEMBER, 1895.

### INTRODUCTION.

In compiling the present Review the principal data made use of are the telegraph reports of observations received at this office for the purpose of weather predictions, and the reports of storms received by mail. For the material used in tracing the course of areas of high and low pressure in the United States, we are indebted to the Chief of the Weather Bureau, Washington, D.C.

### GENERAL SUMMARY OF THE WEATHER.

The area of depression of greatest departure below normal ( $-0.20$  in.) covered Manitoba; there was also a smaller area with the same deficiency over Alberta. Over the Lakes the pressure was about normal, or a little below, but further east it was higher and over Nova Scotia and New Brunswick was  $0.15$  in. above normal. Over British Columbia it was about normal.

Of the low areas tracked two travelled eastward from the North-West Territories and North-West States, five started in the South-West or Southern States and moved either north or north-eastward, two off the Atlantic Coast moved north-eastward and another up the Atlantic Coast, from the Atlantic, moved north across Nova Scotia, and one starting in Minnesota took an exceptional path south-east to and off the Carolinas' coast. The average rate of travel was  $34.0$  miles per hour.

The first week commenced with an extensive anti-cyclone and decidedly cold weather, covering the whole western half of the continent, whilst a trough of low pressure extended from Labrador to the Gulf of Mexico. A cyclone which developed within the trough of low pressure, was on the morning of the 2nd over Western New York, and a general snowfall with a moderate northerly gale set in over the Lake District. From New York the cyclone moved to the Gulf of St. Lawrence, over which it passed on the 3rd; after having caused brisk winds and a general fall of snow or rain throughout Eastern Canada, which was heavy in Nova Scotia; Halifax reporting a fall of  $2.24$  in. and Yarmouth of  $1.96$  in. Following this the anti-cyclone extended for a short time eastward, being accompanied by fair, cold weather from the Lakes to the Atlantic.

A slight depression which appeared over the Upper Lakes on the 3rd gave a moderate snow-fall in Ontario, but soon dispersed.

On the 5th a depression appeared off the middle Atlantic Coast. It passed quickly north-eastward, giving a fresh gale with rain and snow throughout New Brunswick and Nova Scotia on the 5th and 6th. Anti-cyclonic conditions and fine cold weather had continued in the North-West until the night of the 5th, when a moderate depression set in. It brought local snowfalls, but was otherwise unimportant. It was quickly followed by an important anti-cyclone and decidedly cold weather over the North-West. The cyclone moved across the Lakes, where it gave a moderate fall of sleet or snow, with strong winds or moderate gales on the 7th, and from thence passed to the Gulf of St. Lawrence, giving the same conditions later on that day throughout Eastern Canada.

8th—14th. Anti-cyclonic conditions with fine cold weather, which on the 8th extended from the Rocky Mountains to the Atlantic, continued in the Lake Region and eastern districts until the 10th, but on the 9th a depression appeared over Alberta and moved quickly south-east, giving milder weather in the North-West and light snow in Manitoba; it reached the Carolina coast on the 12th. In the meantime another depression which appeared off the Florida coast developed into an important storm and moved up the coast. It gave a strong gale throughout the Maritime Provinces on the 11th and 12th and then passed out to sea. Following this latter depression the former re-developed off the Carolina coast and also passed north-eastward off and up the Atlantic coast, giving a fresh to strong N.E. gale in Nova Scotia and New Brunswick on the 14th.

With the exception of a fall of snow in Western and Southern Ontario on the 11th, caused by the last depression from the North-West, the weather continued fine and decidedly cold throughout the Lake District, Quebec and Northern New Brunswick until the end of the week (14th).

In the North-West, after the 10th, the weather continued fair and mild, a slight increase of pressure at first, being followed by an extensive depression.

15th—21st. Generally high pressure covered the Lakes and Eastern Canada throughout this period, excepting the night of the 21st, when a slight depression gave rain in Western Ontario, and the 17th and 18th, when a depression which approached the Lakes from the west and then receded, caused rain in Ontario and showers in Quebec on the latter day. Otherwise the weather was fair. It was cold in Quebec and New Brunswick in the early part of the week, but with this exception, was mild from the Lakes to the Atlantic.

On the 15th a depression caused high winds and a moderate fall of snow in Alberta and on the 16th and 17th snow or sleet in Assiniboia and Manitoba. This was followed by higher pressure and fine, cold weather until the night of the 19th, then a depression moving eastward from the Rocky Mountains, across the North-West Territories, caused light local falls of snow and somewhat higher temperature on the 20th in Assiniboia and Alberta and on the 21st in Manitoba.

22nd—31st. A depression developed on the 22nd over the Gulf of St. Lawrence and Maritime Provinces, giving a general rain or snowfall throughout Eastern Canada and then passed north-eastward over Newfoundland.

Light rain or snowfalls occurred in Ontario, Quebec and the Maritime Provinces until the 24th, when a slight increase in pressure gave a short interval of fine weather everywhere, but on the 24th a depression from the South-west States moved to the Lakes, giving a fall of rain in Ontario. Another low area forming in the rear of this depression moved up to the Lakes on the 26th and the weather continued unsettled, with high north-west winds. This latter depression passed quickly north-eastward and a general rainstorm and fresh gale set in on the 26th and 27th throughout Eastern Canada. On the 28th the depression passed over the Gulf to Newfoundland. There then followed a slight temporary improvement in the weather from the Lakes east with moderate temperatures, but on the 30th a depression from the Gulf of St. Lawrence moved up the Mississippi Valley to the Lakes and a general gale with sleet or snow or freezing rain set in over Ontario. This soon extended to Quebec, the wind blowing with almost hurricane force. The barometer in the Ottawa Valley fell to 28.88 in. reduced to sea level, great damage was done both in the Province of Ontario and Quebec, especially by the freezing rain, which caused great loss in Montreal to the electric wire systems. At Toronto the wind blew at the rate of 64 miles per hour and at Montreal 67 miles, and in gusts at the rate of 80 miles per hour. It passed north-eastward to Labrador, causing heavy rain and sleet in the Maritime Provinces and throughout Quebec, and a heavy gale blowing 40 miles per hour at Halifax and 60 miles at St. John, N.B.

In the North-West during the same period the weather was fine and cold at first, but on the 22nd and 23rd an extensive depression set in, with higher temperature causing local snowfalls and high winds in Manitoba on the 24th. This was quickly succeeded by higher pressure and a return to colder weather, but again on the 25th another depression appeared over Alberta, with higher temperature, the weather however continuing decidedly cold further east until the 27th, when it became comparatively mild throughout the North-West, with light local falls of snow or sleet.

Higher pressure set in on the 28th and the weather again became decidedly cold everywhere, except in Alberta. Another depression passed across the Territories on the 29th and 30th, the weather continuing cold in Assiniboia and Manitoba. A slight increase in pressure took place on the night of the 30th, followed on the 31st by another depression moving eastward across these districts, accompanied by light local snowfalls.

In British Columbia exceptionally heavy gales and unsettled wet weather were the rule on the coast during the greater part of the month. At Esquimalt a gale on the 22nd and 23rd was severe the wind at times reaching a velocity of 60 miles an hour, with heavy sea running. In the upper mainland snow began about the middle of the month remaining on the ground and attaining a depth of about 6 in. at many places.

## TEMPERATURE.

*The Highest and Lowest Temperature in each Province for December was :*

British Columbia,	61°·9 on 5th at Salmon Arm,	— 30°·9 on 17th at Stuart's Lake.
North-West Territories,	59°·6 on 13th at Medicine Hat,	— 55°·0 on 25th at Fort Simpson.
Manitoba,	44°·0 on 13th at Freherne,	— 31°·0 on 26th at Oakbank.
Ontario,	63°·0 on 17th at Cartier,	— 38°·7 on 8th at White River.
Quebec,	59°·0 on 21st at Brome,	— 25°·3 on 13th at Richmond.
New Brunswick,	57°·7 on 31st at Fredericton,	— 14°·8 on 13th at Fredericton.
Nova Scotia,	68°·0 on 3rd at Port Hastings,	7°·0 on 13th at Yarmouth.
P. E. Island,	55°·0 on 3rd at Georgetown,	11°·5 on 10th Charlottetown.

Earthquake shock at Montreal on the 9th at 12:25 a.m.

# PRESSURE, TEMPERATURE, WIND AND PRECIPITATION AT STATIONS IN THE DOMINION OF CANADA, DECEMBER, 1895.

or, Barometer not reduced to Sea Level. \* Stations not furnished with Registering Thermometers.

STATION.	PRESSURE.			TEMPERATURE.				DIRECTION OF WIND FROM						VELOCITY OF WIND		PRECIPITATION.	No. of fair days.	No. of Auroras.	No. of Wind-storms.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
	Elevation above Sea Level, in feet.	Mean reduced.	Highest.	Lowest.	Range.	Mean.	Difference from average.	Years observed.	Hight.	Date.	Lowest.	Date.	Mean daily range.	Mean temperature of air.	Mean relative humidity.					Mean amount of (cloud.)	No. of days completely clouded.	DIRECTION OF WIND FROM				Total number of hours.	Mean miles per hour.	Highest day's velocity.	Date and direction from.	Amount.	(Difference from average.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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## PRECIPITATION.

Throughout the Dominion the rainfall was above the average, the greatest excess occurring in Vancouver Island and at the coast stations in British Columbia.

*The general distribution is as follows :—*

In British Columbia the rainfall was in general 6·75 in., or about 3·43 in. above the average.

In the North-west Territories, inappreciable, the fall occurring only at a few stations.

In Manitoba the rainfall was inappreciable, or slightly below the average.

In Ontario, West and South-west District, it was 2·70 in., or 1·23 in. above the average. In the North and North-west District it was 1·57 in., or ·77 in. above the average. In the Central District it was 1·75 in., or 0·71 in. above the average, and in the East and North-east District it was 2·87 in., or 2·09 in. above the average.

In Quebec it was 1·81 in., or 1·08 in. above the average.

In New Brunswick it was 2·33 in., or 0·98 in. above the average.

In Nova Scotia it was 3·84 in., or 1·53 in. above the average.

In Prince Edward Island it was 2·32 in., or 0·98 in. above the average.

*Rainfall 5 inches and upwards during the month :—*

BRITISH COLUMBIA.—Esquimalt, 10·65 in.; Kuper Island, 11·23 in.; Rivers Inlet, 15·48 in.; Port Simpson, 9·95 in.; Chilliwack, 9·32 in.; Quatsino, 12·94 in.; Agassiz, 9·74 in.; French Creek, 8·12 in.; Canobie, 12·11 in.; Nanaimo, 10·69 in.; Loch Erroch, 11·25 in.; New Westminster, 5·68 in.; Abbotsford, 7·31 in.; Alberni, 13·45 in.; Hazlemere, 6·07 in.; Beaver Creek, 17·53 in.; Goldstream Lake, 19·08 in.; Union, 11·97 in.; Salt Spring Island, 10·30 in.; Valdez, 10·87 in.; Langley, 7·17 in.; Quamichan (2), 9·04 in.; NOVA SCOTIA, Halifax, 5·56 in.; Sable Island, 6·65 in.

BERMUDA, 5·84 in.

*Rain 1 inch and upwards in 24 hours :—*

2. St. John, 1·02 in.; Stony Creek, 1·12 in.; Chatham, 1·02 in.; Halifax, 2·84 in.; Yarmouth, 1·18 in.

3. Sydney, 1·72 in.; Channell, 1·26 in.

4. Bermuda, 2·08 in.

6. St. Johns, 1·36 in.

9. Esquimalt, 1·45 in.; Kuper Island, 2·17 in.; Rivers Inlet, 1·20 in.

11. Rivers Inlet, 3·03 in.; Sable Island, 1·50 in.

12. Kuper Island, 1·09 in.; Rivers Inlet, 1·09 in.

14. Kuper Island, 1·14 in.

15. Truro, 1·07 in.; St. Johns, 1·35 in.; Sable Island, 2·45 in.; Channell, 1·85 in.

19. Cottam, 1·08 in.

21. Welland, 1·11 in.

22. Port Simpson, 1·60 in.; Agincourt, 1·43 in.

24. Rivers Inlet, 1·02 in.; Port Simpson, 1·23 in.

25. Port Simpson, 1·38 in.; Stony Creek, 1·21 in.

26. Ottawa, 1·10 in.; Esquimalt, 1·43 in.; Rivers Inlet, 2·75 in.; Port Simpson, 1·18 in.; Clonarf, 1·45 in.; Thorold, 1·25 in.; Bancroft, 1·39 in.

29. Rivers Inlet, 1·04 in.

The snowfall has in general been below the average, especially in the Eastern Provinces. The lightning was general in the early part of the month, but only for a short time.

BRITISH COLUMBIA. Snow fell in the Province as a whole to a depth of about 23·7 in.

In the NORTH-WEST TERRITORIES 7 in. has fallen, about 4 in. more than in December, 1894.

In MANITOBA 8 in. has fallen, or about the average.

In ONTARIO in the same districts as in the rainfall 11·1 in., or 4·1 in. below the average; 21·5 in., or 3·4 in. below the average; 10·8 in., or 3·9 in. below the average; 9·5 in., or 9·3 in. below the average.

In QUEBEC 11·9 in., or 9·5 in. below the average.

In NEW BRUNSWICK 10·7 in., or 8·5 in. below the average.

In NOVA SCOTIA 3·2 in., or 7·0 in. below the average.

In PRINCE EDWARD ISLAND 2·4 in., or 2·40 in. below the average.

*Monthly snowfall 12 in. and upwards :—*

BRITISH COLUMBIA.—Rivers Inlet, 37 in.; Port Simpson, 20 in.; Agassiz, 40 in.; Canobie, 14 in.; Quamichan, 17 in.; Loch Erroch, 16 in.; Princeton, 24 in.; New Westminster, 49 in.; Abbotsford, 13 in.; Salmon Arm, 23 in.; Barkerville, 59 in.; Glacier, 91 in.; Alberni, 45 in.; Pilot Bay, 18 in.; Mission Valley, 16 in.; Griffin Lake, 68 in.; Donald, 55 in.; Alberni, 20 in.; Goldstream Lake, 79 in.; Union, 36 in.; Valdez Island, 29 in.; Nanaimo, 16 in.; Chilliwack, 18 in.; Enderby, 25 in.; Kaslo, 20 in.

NORTH-WEST TERRITORIES.—Banff, 217 in.

MANITOBA.—Winnipeg, 17 in.; Oakbank, 17 in.

ONTARIO.—Coldwater, 19 in.; Stratford, 17 in.; Haileybury, 16 in.; Durham, 18 in.; Woodstock, 13 in.; Gravenhurst, 16 in.; Lucknow, 24 in.; Sprucedale, 29 in.; Uplands, 30 in.; Haliburton, 13 in.; St. Mary's, 14 in.; Clontarf, 15 in.; Birnam, 24 in.; Paris, 13 in.; Cottam, 12 in.; Mattawa, 22 in.; Georgina, 19 in.; Savanne, 22 in.; Missanabie, 17 in.; Beatrice, 16 in.; Point Clark, 16 in.; Bancroft, 22 in.; Conestogo, 20 in.; Alton, 15 in.; North Bay, 20 in.; Bognor, 25 in.; Whiteside, 30 in.; Calvin, 30 in.; Biscotasing, 41 in.; Heron Bay, 13 in.; Burk's Falls, 23 in.; North Bruce, 20 in.; Nepigon, 21 in.; Parry Sound, 45 in.; White River, 16 in.; Port Stanley, 15 in.; Rockliffe, 24 in.; Saugeen, 34 in.; Thedford, 18 in.; Cowal, 12 in.; Sparrow Lake, 15 in.; Denbigh, 19 in.; Sunshine, 16 in.; Orangeville, 20 in.; Huntsville, 22 in.; Blenheim, 19 in.; Midland, 12 in.; Wyoming, 15 in.; Emsdale, 18 in.; Ursa, 13 in.; Thompson, 19 in.; Coldstream, 12 in.; Mount Forest, 20 in.; Warton, 26 in.; Wilton Grove, 12 in.; Presqu'Isle, 17 in.; Barclay, 25 in.

QUEBEC.—Montreal, 12 in.; Point des Monts, 17 in.; Cape Magdalene, 34 in.; Father Point, 13 in.

NEW BRUNSWICK.—Bathurst, 15 in.; Dalhousie, 23 in.

NOVA SCOTIA.—Sable Island, 14 in.

NEWFOUNDLAND.—St. Johns, 13 in.

*Snow 4 inches and upwards in 24 hours :—*

1. Sprucedale, 4 in.; Stouffville, 4 in.; Bancroft, 6 in.; Cartier, 4 in.; Parry Sound, 6 in.
2. Stratford, 6 in.; Lindsay, 6 in.; Ottawa, 4 in.; Durham, 6 in.; Woodstock, 7 in.; Alton, 6 in.; Haliburton, 4 in.; St. Mary's, 5 in.; Birnam, 9 in.; Beatrice, 4 in.; Conestogo, 6 in.; Whiteside, 5 in.; Port Stanley, 5 in.; Father Point, 5 in.; Dalhousie, 7 in.; Montreal, 5 in.
3. Spence, 10 in.; DeCewsville, 4 in.; Pelee Island, 6 in.; Parry Sound, 5 in.
4. Welland, 7 in.; Parry Sound, 9 in.; Port Stanley, 6 in.
5. Coldwater, 5 in.; Thorold, 9 in.; Point Clark, 4 in.; Owen Sound, 5 in.; Kingston, 11 in.; Grand Manan, 4 in.; Winnipeg, 6 in.; Point Lepreaux, 6 in.
6. Fredericton, 5 in.; Bathurst, 12 in.; Oakbank, 5 in.; North Bruce, 4 in.; Chatham, 4 in.; St. Andrews, 8 in.
7. Clontarf, 4 in.; Bancroft, 4 in.; Calvin, 6 in.; Burk's Falls, 4 in.; White River, 5 in.; Rockliffe, 6 in.; Dalhousie, 4 in.
10. Oakbank, 6 in.
11. Sable Island, 5 in.
12. Paris, 5 in.; St. Johns, 8 in.; Sable Island, 7 in.
13. Port Simpson, 6 in.; Oakbank, 4 in.; Stony Creek, 4 in.
14. Rivers Inlet, 6 in.; Savanne, 6 in.
15. Edmonton, 4 in.
16. Esquimalt, 6 in.; Kuper Island, 4 in.; Savanne, 4 in.
17. Rivers Inlet, 6 in.; Hillview, 6 in.; Qu'Appelle, 4 in.
18. Mattawa, 5 in.
21. Rivers Inlet, 4 in.
24. Biscotasing, 4 in.
25. Savanne, 4 in.; Nepigon, 10 in.; Port Arthur, 5 in.
26. Coldwater, 5 in.; Durham, 6 in.; Lucknow, 5 in.; Sprucedale, 6 in.; Birnam, 5 in.; Sarnia, 6 in.; Mattawa, 8 in.; Point Clark, 6 in.; Alton, 5 in.; Bognor, 5 in.; Owen Sound, 5 in.; Calvin, 8 in.; Burk's Falls, 6 in.; Parry Sound, 5 in.; Rockliffe, 6 in.; Saugeen, 4 in.
27. Lucknow, 6 in.; Whiteside, 4 in.; Biscotasing, 5 in.; Calgary, 4 in.
28. Nepigon, 5 in.
29. Savanne, 6 in.; Conestogo, 4 in.
30. Durham, 6 in.; Rivers Inlet, 9 in.; Mattawa, 4 in.; Point Clark, 6 in.; Bancroft, 6 in.; Whiteside, 4 in.
31. Haileybury, 6 in.; Rivers Inlet, 9 in.; Port Simpson, 6 in.; Gravenhurst, 5 in.; Spence, 10 in.; Whiteside, 10 in.; Calvin, 9 in.; Biscotasing, 5 in.; Cartier, 4 in.; Burk's Falls, 4 in.; Parry Sound, 7 in.; Sprucedale, 12 in.; Haliburton, 5 in.; Beatrice, 6 in.; Bognor, 13 in.; Owen Sound, 7 in.; Rockliffe, 5 in.; Saugeen, 7 in.; Dalhousie, 11 in.

# PRECIPITATION AT STATIONS REPORTING RAIN, SNOW AND WEATHER.

STATIONS.	RAINFALL.					SNOWFALL.			
	Amount in inches.	No. of Days of or Over.	No. of Fair Days.	Heaviest Fall in Month.	Date	Amount in inches.	Number of Days.	Heaviest Fall in Month.	Date.
<b>BRITISH COLUMBIA—</b>									
Beaver Creek.....	17.53	16	10	2.47	11	13.9	7	8.1	19
Goldstream Lake.....	19.68	19	7	5.15	31	79.0	7	21.0	19
Union.....	11.63	19	7	2.16	11	36.0	7	14.0	19
Salt Spring Island.....	10.30	20	10	2.20	31	2.1	1	3.1	16
Valdez Island.....	10.89	18	6	2.30	11	20.0	9	9.5	18
Langley.....	7.16	18	10	1.74	9	8.5	7	6.1	31
Quamichan (2).....	9.64	16	10	2.37	9	17.1	6	5.0	31
Nanaimo.....	10.69	16	19	2.24	9	15.5	7	5.0	19
<b>N. W. TERRITORIES</b>									
.....	.....	.....	29	.....	.....	6.0	2	6.0	17
<b>MANITOBA—</b>									
Norquay.....	.....	.....	19	.....	.....	6.8	10	1.5	17
Greta.....	.....	.....	24	.....	.....	5.3	6	2.0	16
Pilot Mound.....	.....	.....	24	.....	.....	3.0	3	2.0	28
Hartney.....	.....	.....	26	.....	.....	2.0	5	2.0	31
Morden.....	R	1	20	.....	.....	1.2	4	0.7	21
Turtle Mountain.....	.....	.....	29	.....	.....	2.5	2	2.0	31
<b>ONTARIO—</b>									
Smith's Falls.....	3.60	8	21	1.49	26	3.7	3	3.0	2
Theford.....	3.20	8	20	0.35	24	18.0	3	8.0	31
Arlan.....	3.28	8	19	1.30	26	0.0	4	5.0	2
Oliver's Ferry.....	3.26	8	22	1.32	26	3.0	1	3.0	2
Cowal.....	3.15	10	19	0.72	18	11.5	3	5.5	1
Sparrow Lake.....	3.70	9	16	0.41	18	15.5	3	6.0	2
Croydon.....	3.99	10	19	1.30	26	2.7	2	1.2	2
Lansdowne.....	4.18	8	19	1.45	20	3.0	4	1.0	2
Otonabee.....	2.86	9	18	0.90	27	6.6	4	4.5	2
Bakeygon.....	3.45	6	19	0.85	25	10.0	6	1.0	1
Emmerson.....	3.00	2	28	1.25	26	6.0	1	6.0	1
Denbigh.....	2.85	6	18	0.93	18	19.1	8	7.3	2
Sunshine.....	2.57	6	15	0.70	29	16.5	10	3.0	2
Jernyn.....	3.83	10	18	0.84	27	5.9	4	4.0	3
Leon's Head.....	3.30	6	18	0.95	19	.....	.....	.....	.....
Orangeville.....	3.38	8	18	1.16	22	19.8	6	7.9	2
Huntsville.....	2.63	6	19	2.10	22	22.5	6	15.0	31
Henheim.....	3.73	9	17	0.98	26	19.5	6	6.0	11
Seabrough.....	3.49	9	15	1.14	21	5.3	7	2.0	2
Molland.....	1.77	9	15	0.47	19	12.5	7	4.0	26
Georgetown.....	2.79	14	11	0.65	21	11.4	10	6.0	2
Princeton.....	2.35	9	18	1.49	19	4.9	6	2.0	11
Wyoming.....	3.21	7	19	1.05	19	15.0	6	4.0	2
Wooler.....	2.60	7	22	1.12	26	7.8	2	4.0	5
Embside.....	3.8	7	17	0.91	18	18.0	7	5.0	26
Cherry Valley.....	3.42	7	20	0.87	26	2.0	1	2.0	3
Westport.....	3.97	9	21	1.99	26	1.3	1	1.3	2
Parma.....	4.29	11	18	1.33	27	3.5	2	2.0	5
Roblin's Mills.....	4.35	9	20	1.19	26	3.4	2	2.0	2
Uxal.....	3.44	11	16	0.94	17	13.0	2	6.0	31
Thompson.....	2.77	4	24	2.41	21	19.0	3	8.0	31
Aurora.....	3.00	9	17	1.12	21	7.8	6	5.8	2
Montague.....	3.39	7	22	1.27	26	3.0	2	2.0	2
Coldstream.....	3.19	10	19	0.92	26	12.0	4	4.0	31
Mount Forest.....	3.23	11	11	0.61	19	20.3	10	6.0	31
Deafstown.....	3.52	9	19	0.86	25	9.0	4	3.0	2
Wartow.....	2.65	7	17	1.10	18	26.0	8	8.0	5
Deer Park.....	3.64	10	17	1.02	22	4.9	5	1.8	2
Wilton Grove.....	2.01	7	21	0.59	21	12.0	4	6.0	2
Watford.....	2.14	6	17	0.90	19	.....	.....	.....	.....
Presqu'Isle.....	1.70	6	17	0.90	20	17.0	8	6.0	31

*Aurora recorded—*

Where the class of aurora is noted by the observer, it is given, (I) being the brightest, (IV) the feeblest in brilliancy.

7. Hillview, IV; Channel Island, III; Moose Jaw, IV; Winnipeg, IV; Qu'Appelle, III; Fort Simpson.

8. Haileybury, IV; Durham, III; Hillview, III; Treherne, III; Russell, III; Channel Island, IV; Moose Jaw, II; Grenfell, Gravenhurst, IV; St. Albans, IV; St. Andrews, IV; Winnipeg, IV; Minnedosa, IV; Quebec, III; Dalhousie, *brilliant*; Montreal, Fort Simpson.

9. Fredericton, IV; Truro, IV; Hillview, II.

10. Haileybury, IV; Elkhorn, III; Henrietta, I; Moose Jaw, Swift Current, III; Fort Simpson.

11. Edmonton, II.

13. Fort Simpson.

14. Treherne, II; Portage la Prairie, Moose Jaw.

16. Fort Simpson.

17. Treherne, IV.

18. Hillview, IV; Treherne, II; Prince Albert, I.

19. Hillview, IV; Treherne, IV; Prince Albert, I; Battleford, IV.

20. Prince Albert, II; Edmonton, III.

21. Hillview, IV; Treherne, II; Moose Jaw, III; Henrietta, I; Moose Jaw, Grenfell, Port Dover.

22. Haileybury, IV; Elkhorn, III; Hillview, IV; Treherne, IV; Prince, Albert, I; Fort Simpson.

23. Channel Island, IV; Medicine Hat, IV.

24. Medicine Hat, IV.

25. St. Albans, III.

PROPORTION OF BRIGHT SUNSHINE REGISTERED IN EACH HOUR OF THE DAY DURING WHICH THE SUN WAS ABOVE THE HORIZON IN THE MONTH OF DECEMBER, 1885.

	HOURS ENDING															
	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	NOON.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
ESQUIMAULT .....	..	..	..	0 00	0 03	0 13	0 15	0 16	0 16	0 20	0 15	0 03	..	..	..	..
KUPER ISLAND .....	..	..	..	'00	'01	10	'28	'25	'32	'23	'28	10	..	..	..	..
AGASSIZ, B. C. ....	..	..	..	'00	'00	09	'15	'26	'20	'23	'16	08	..	..	..	..
BATTLEFORD .....	..	..	..	'03	'31	'48	'53	'48	'46	'32	'11	00	..	..	..	..
INDIAN HEAD .....	..	..	..	00	00	'25	'51	'61	'60	41	'04	00	..	..	..	..
BRANDON .....	..	..	..	'00	05	'25	'39	'33	'48	'52	'52	19	..	..	..	..
WINNIPEG .....	..	..	..	'00	'10	24	'28	'31	'31	'20	'24	07	..	..	..	..
WOODSTOCK .....	..	..	..	'00	05	'09	'21	'29	'33	'32	'28	15	..	..	..	..
TORONTO .....	..	..	..	'02	'14	'21	'22	'28	27	'27	'24	19	8	..	..	..
LINDSAY .....	..	..	..	'03	'13	22	'23	'26	27	'22	'15	'12	'04	..	..	..
BARRIE .....	..	..	..	'00	'05	12	'15	18	24	20	'16	07	..	..	..	..
KINGSTON .....	..	..	..	05	'27	'35	'36	'40	'42	'40	'36	'23	9	..	..	..
MONTREAL .....	..	..	..	'10	'05	'29	'47	'45	45	'46	'37	'10	..	..	..	..
FREDERICTON .....	..	..	..	'07	'25	'34	'48	51	'53	'55	'50	'27	..	..	..	..
MEAN PROPORTION FOR MONTH.....	0 12	0 19	0 15	0 34	0 30	0 34	0 23	0 20	0 21	0 18	0 13	0 32	0 35	0 39	0 35	0 39
(Constant sunshine being 1.)																
MAXIMUM DAILY AMOUNT .....	0 86	0 78	0 66	0 74	0 62	0 86	0 87	0 88	0 81	0 85	0 81	0 92	0 92	0 91	0 92	0 91
DATE .....	2	27	27	1	29	1	1	28	5	8	28	8	11	4	11	4
NO. OF DAYS COMPLETELY CLOUDED.....	21	12	18	12	10	6	12	15	10	15	17	11	8	10	8	10

# STORM WARNINGS.

During the month warnings on the approach of seven storms were issued to our agents and cautionary signals duly displayed at the various signal stations. The total number of warnings issued was 182, of which 171 were verified. At 17 stations, however, the force exceeded, and at 27 did not reach that indicated by the signals displayed; 10 stations reported warnings received late, owing to delay in issue and 5 owing to delay in transmission. One station reported a heavy gale for which no warning was issued.

In connection with the warnings, predictions as to probable directions of the wind were given, and of the 171 warnings verified as to force 155, or 90·6 per cent were fully verified, and 171, or 100·0 were fully and partially verified.

1. At 10.30 p.m. on the 1st, stations on all the lakes except Superior were warned for a moderate north-westerly gale in consequence of the movement of a developing depression up the Mississippi Valley. On the following morning at 10.40, stations on the St. Lawrence were warned of a heavy N.E. to N.W. gale, and on the seaboard for a heavy S.W. to N.W. gale, the depression being then centered over New York State as a more important storm. A moderate gale from the north-west prevailed pretty generally over the Lake Region on the 2nd, and during the evening and night of the same day there was a heavy gale at a number of places in Eastern Canada. North Sydney reports "wind blew with hurricane force from the south-west." Ingonish and Port Morien reported a heavy gale. Halifax recorded 43 miles an hour. Signals were lowered in all localities on the morning of the 3rd.

2. At 11.30 a.m. on the 5th, ocean stations were warned for a moderate E. through N. to N.W. gale, a disturbance being then apparently situated off the Middle Atlantic Coast. The disturbance quickly proved to be one of much importance, and on the 6th it gave a general and heavy gale throughout the district warned, accompanied by snow and rain. St. John recorded N.W. 47 miles an hour; Halifax N.W. 51 miles an hour; Port Morien reported heavy gale and Port Hood and Canso very heavy gale. Signals were lowered at 4.10 p.m. on the 6th.

3. At 11.30 a.m. on the 7th, stations in the Gulf of St. Lawrence and along the Atlantic Coast were warned for a moderate gale in advance of a depression which was approaching from the north-westward. During the night a moderate gale occurred very locally over the districts notified. Signals were lowered at 10 a.m. on the 8th.

4. At 10.55 a.m. on the 10th, stations in the Gulf and on Atlantic Coast were warned for a heavy easterly gale. The disturbance for which these warnings were issued passed across the Gulf of Mexico, then developed great energy as it travelled up the Atlantic Coast. Digby, North Sydney and Canso reported a very heavy gale during the early part of the 11th, and Tignish and Port Morien a heavy gale. Sable Island anemometer recorded 78 miles an hour. Signals were lowered at 11.10 a.m. on the 12th.

5. Stations in Nova Scotia and on the Bay of Fundy were warned at 10 p.m. on the 13th for a moderate gale, as a disturbance was apparently moving northward some distance off the United States Atlantic Coast. Next morning as the disturbance was seemingly becoming more important, the cones were changed to storm signals for a heavy N.E. to N.W. gale, and at the same time they were further extended to all Gulf and Ocean Stations. Yarmouth reports that the "S. S. Boston" encountered a heavy gale in the Bay of Fundy on the 14th, and North Sydney, Georgetown, Canso, Glace Bay and Port Morien report a heavy gale. Sable Island anemometer recorded 50 miles an hour. Signals were lowered at 9.30 a.m. on the 15th.

6. All stations were warned at 11.25 a.m. on the 26th, for a heavy easterly gale, as a disturbance then centered near Tennessee was travelling north-eastward with increasing energy. On the morning of the 27th a heavy south-westerly gale prevailed over the Bay of Fundy, but in other districts the gales were only local and moderate. Signals were lowered at 4 p.m. on the 27th.

7. Maritime Province stations were warned at 10.35 p.m. on the 30th for a moderate E., S. and S.W. storm, as a disturbance of some importance then covered the lake region. On the following morning storm signals were substituted for the cones, the disturbance being then central near Montreal as a severe storm. During the 31st a heavy gale prevailed throughout the districts warned and at St. John S.W. 60 miles an hour was recorded. Signals were lowered at 10.10 p.m. on the 31st

#### PROBABILITIES.

The probabilities issued by this office at 11 p.m. each night are posted up at every telegraph station in Canada, and are for the 24 hours beginning at 8 a.m. the following day.

The number of predictions issued during the month was 590. These were divided as follows :—

DISTRICT.	No. ISSUED.	VERIFIED.			
		No. Fully.	No. Partly.	No. Not.	Percentage.
MANITOBA .....	91	59	17	15	74.2
LOWER LAKE REGION .....	107	72	17	18	75.2
UPPER ST. LAWRENCE .....	94	65	3	20	73.9
LOWER ST. LAWRENCE .....	94	65	12	17	75.5
GULF .....	96	62	17	17	73.4
MARITIME PROVINCES .....	108	68	24	16	74.1
TOTAL .....	590	391	96	103	74.4

In order to obtain the percentage of verification of the predictions, the number partly verified is divided by two and added to the number fully verified, and the result divided by the total number issued.

In ascertaining to what extent predictions have been verified, the reports from all observing stations are used.

TORONTO OBSERVATORY—MAGNETIC REVIEW FOR DECEMBER, 1895.

Mean westerly declination.....	4°46'8
Mean horizontal force.....	0·16646
Mean vertical force.....	0·60311

*Declination.*—The needle was slightly disturbed on the first six days of the month and considerably disturbed on the 7th and 8th. On the 7th a marked easterly extreme occurred at 10<sup>h</sup> 30<sup>m</sup>, the reading being then 21' east of the monthly mean, and on the 8th at 2<sup>h</sup> a reading 22'9 west of the mean was registered; a gradual easterly curve then followed and by 4<sup>h</sup> the magnet was east of normal 11'5. During the morning and night of the 8th some rapid swings were recorded and irregular movements were shewn on the 9th and 10th, also during the morning of the 11th. From the 12th to the 20th a comparatively quiet period prevailed. On the morning of the 21st slight irregularities commenced and were visible off and on to the morning of the 27th, and from then to the end of the month the magnet was exceptionally steady.

*Horizontal Force.*—A sharp little increase was noted at 1<sup>h</sup> 40<sup>m</sup> of the 7th. This was followed by slight changes of force at intervals up to 20<sup>h</sup>. At 1<sup>h</sup> 20<sup>m</sup> of the 8th the force commenced to decrease and a change of 0·0008 C.G.S. during the following forty minutes was recorded; all the morning of the 8th the magnet trembled considerably, but there were no important changes. This disturbance continued up to 22<sup>h</sup> 30<sup>m</sup>. Slow changes of force were going on during the evening of the 10th. A slow decrease of force set in on the 11th after 10<sup>h</sup> and in about one hour's time the magnet as slowly moved back to its normal reading. A steady period then followed, lasting up to the 21st, when some slight changes began and were visible occasionally up to the 27th. From this date to the end of the month nothing of any importance was recorded.

*Vertical Force.*—A slight decrease of this component occurred on the early hours of the 8th, and this decrease was the only change worthy of note during the month.

*Aurora.*—On the 2nd, 3rd, 5th, 13th, 15th, 16th, 23rd and 31st, the sky was clear, but no aurora was observed. On all other nights clouds or haze would have hidden any aurora which might have existed.

R. F. STUPART,  
*Director.*

Meteorological Office,  
Toronto, April 22nd, 1896.

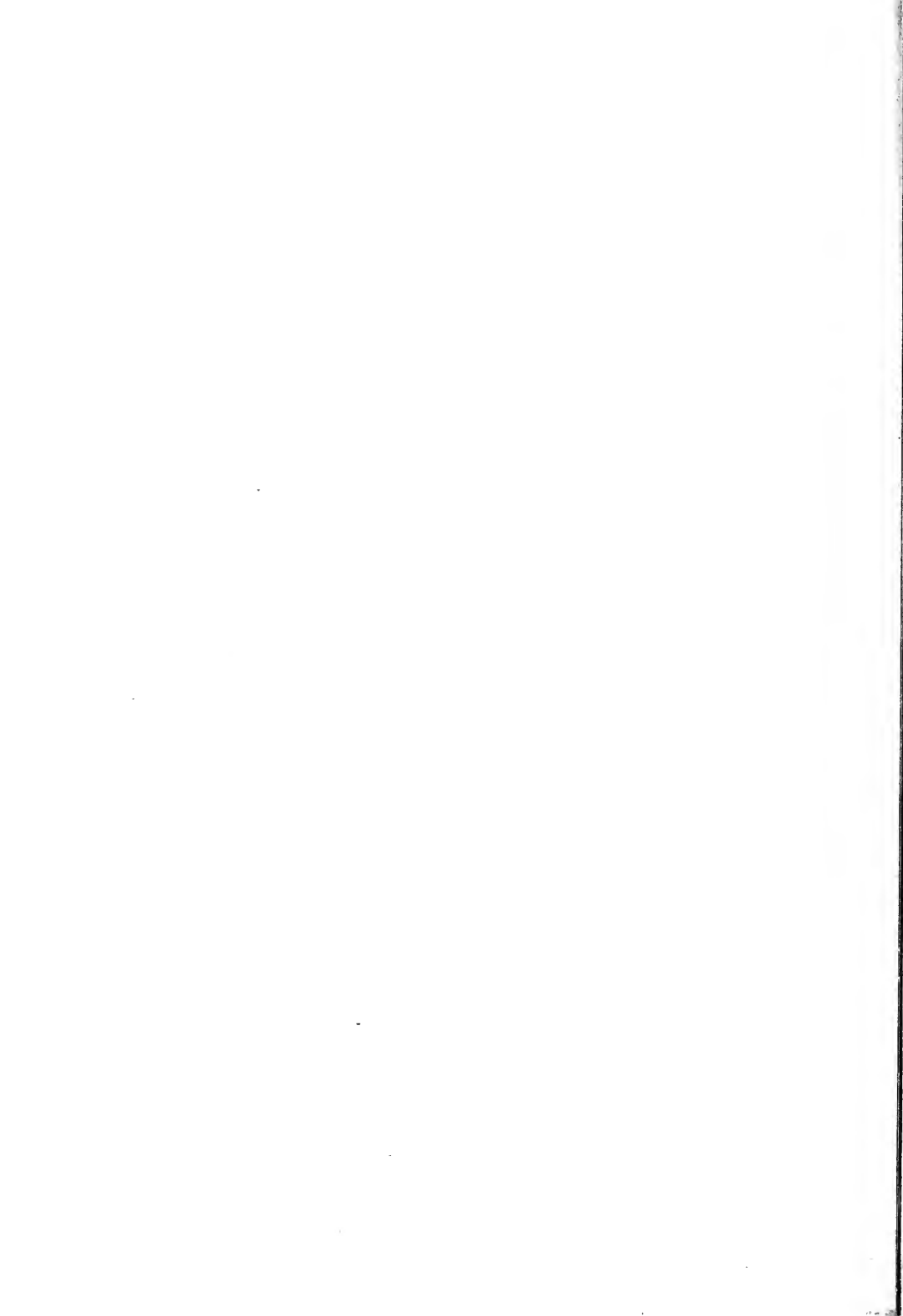












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